Severe Infectious Disease in the Elderly

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THE INCREASING average age and life expectancy of our population is principally attributable to the reduced mortality of the various diseases in the younger age groups. Since the advent of sulfonamides and antibiotics, it is only a slight exaggeration to state that young persons now rarely die of infectious diseases. Observation of patients whose infections are treated adequately with antibacterial agents also leads one to the unescapable conclusion that, while people still die during the course of an infection, few actually die due to the infection itself. In other words, the infectious agent is usually successfully destroyed, but certain physiological and anatomical abnormalities which the infection has produced are incompatible with life.

In addition to these factors, the occurrence of various infectious diseases in the older age group has been indirectly affected by the mass immunization of our childhood population in recent years, as well as the control of environmental factors which formerly played an important part in many of the acute infections of children. Consequently, many adults have been denied the natural immunizing effects of subclinical infection because of the reduced prevalence of the infecting agent. This is strikingly true of poliomyelitis which is no longer a relatively benign infantile paralysis, but rather a severe paralyzing disease of young adults. Moreover, few older adults have been

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subjected to the artificial immunizing procedures which have so reduced the incidence of such diseases as diphtheria and tetanus in childhood. The net result of these many factors appears to be an increasing number of elderly individuals who may be decreasingly immune to disease. Furthermore, while our ability to understand and combat the problems of infection *per se* has increased, our understanding of the management of the disturbed physiological processes has lagged behind.

SINCE THE mortality rate from infectious diseases is known to be high amongst elderly individuals, one or both of two factors may be the reason. The individual may be unable to combat the infecting organism by reason of deficiency of antibodies, or the aged persons may succumb from the added strain of severe infection on vital organs and physiological processes. Surprisingly little direct information is available on the first premise. It has been demonstrated that the titer of iso-agglutinins declines with advancing years[1]. On the other hand, since the old person has had greater opportunity to have antigenic exposure to many pathogens, he might be expected to have higher antibody titers than younger individuals. Blake[2], however, found non-type-specific pneumococcus agglutinins to diminish with age. In contrast, Felton[3] found that type-specific antibodies against types I and II pneumococci are as frequently found in persons of advanced years as in younger individuals. Moreover, antibody response to pneumococcus vaccination is comparable in all age groups. The premise of increased susceptibility of the elderly to disturbances of vital processes by the stress of infection seems probable because of the amply demonstrated fact that structural and functional abnormalities of the cardiovascular system, kidneys, lungs and other organ systems are extremely common.

This paper represents a study of three severe infectious diseases, treated according to accepted modern concepts, to determine those factors of morbidity, clinical course, and mortality peculiar to the older age group. Meningitis has been selected because it represents a severe disease producing profound disturbances in the physiological processes of the body. Pneumonia was chosen for similar reasons, but also because of the dramatic effect which antibacterial therapy exhibits in altering the course of the disease in all age groups. Diphtheria was selected because much data is available concerning the immune mechanisms and because it represents primarily a severe intoxication rather than an infection characterized by bacterial invasion.

THE MENINGITIS series, limited to cases of meningococcal and pneumococcal etiology, includes 222 patients treated at the San Francisco Hospital from January, 1943 to February, 1946. Other aspects of this group have been reported previously[4]. The pneumonia series consists of 200 unselected cases encountered at the San Francisco Hospital in the early months of 1947. The diphtheria series represents 147 cases treated at the San Francisco Hospital from January, 1942 to December, 1947.

Patients over the age of 45 years were arbitrarily assigned to the older age group in all series.

MENINGITIS

Of 222 cases of bacterial meningitis, 182 were produced by meningococci, and 40 were of pneumococcal origin. Meningococcal meningitis was 5 times as common in the younger group as in the older. On the other hand, in pneumococcal meningitis the elderly predominated in a ratio of 6 to 4. Since immunity to meningococcal infection is probably primarily a

TABLE I
INCIDENCE AND MORTALITY RATE OF MENINGITIS BY AGE GROUPS

Etiology	Meningococcal		Pneumococcal	
Total Cases	182		40	
Incidence under 45 years	151	(82.9%)	16	(40.0%)
Incidence over 45 years	55	(17.1%)	24	(60.0%)
Mortality rate under 45 years	12.6%		43.8%	
Mortality rate over 45 years	58.1%		83.3%	

serological phenomenon[5], one would expect the older age group, who have presumably had greater opportunity to develop immunity by reason of exposure, to be relatively resistant. Such is the case. On the contrary, circulating antibodies against pneumococci play a less important part in preventing infection. Certain other factors common in the aged, including co-existent disease, chilling, and anesthesia, predispose to pneumococcal pneumonia[6] and consequently to pneumococcal meningitis, its not uncommon sequel.

Further evidence suggesting similar degrees of resistance to bacterial infection in the two age groups may be obtained from analysis of their responses to the infecting agents.

TABLE II
SEVERITY OF MENINGITIS BY AGE GROUPS

Etiology		Meningococcal	Pneumococcal	Both
Bacteremia	Under 45 years	12.2%	50.0%	
	Over 45 years	20.0%	54.2%	
Cerebrospinal fluid cells less than 1000 per cu. mm.	Under 45 years	13.2%	12.5%	
	Over 45 years	12.9%	20.8%	
Normal cerebrospinal fluid sugar	Under 45 years	18.1%		
	Over 45 years	14.6%		
Complications of Infection	Under 45 years			7.3%
	Over 45 years			7.3%
Coincidental Complications	Under 45 years			0.6%
	Over 45 years			12.7%
Coma	Under 45 years			49.7%
	Over 45 years			85.5%
Hyperpnea	Under 45 years			8.5%
	Over 45 years			38.2%

Bacteremia, which in pneumococcal meningitis suggests decreased resistance to the organism, and which implies an ominous prognosis[4], occurred in 50.0 per cent of the younger group and 54.2 per cent of the older group, an almost equal incidence. Meningococcemia is an integral part of meningococcal meningitis and has no similar implications[4]. In pneumococcal meningitis a cerebrospinal fluid cell content of less than 1000 per cu. mm. is a manifestation of severe and uniformly fatal infection[4]. This occurred in 12.5 per cent of the younger group and 20.8 per cent of the older. Conversely, a cerebrospinal fluid cell count of less than 1000 per cu. mm. has been established as a favorable sign[4] suggesting a mild infection in the case of meningococcal meningitis. This phenomenon was observed in 13.2 per cent of the young group and 12.9 per cent of the elderly group. Normal sugar content of the spinal fluid may be considered evidence of mild infection in meningococcal meningitis[4]. Normal cerebrospinal fluid sugar levels were demonstrated in 18.1 per cent of the younger patients and in 14.6 per cent of the older patients. Moreover, complications due to the infection *per se* occurred in 7.3 per cent of both groups. These factors, therefore, signify that the severity of the infection, itself, and thereby the resistance of the individual to the infection does not vary significantly with age.

In sharp contrast, the mortality rate of the older group in meningococcal meningitis was almost 5 times that in the younger group. Similarly deaths from pneumococcal meningitis in the aged exceeded those in the young in a ratio of 2 to 1. Since the infections were of approximately equal severity, the reasons for this discrepancy in mortality must be further sought for.

Coma occurring in the course of meningitis is a manifestation of profound physiological disturbance of the central nervous system, and has been demonstrated to be an unfavorable prognostic sign[4]. Coma occurred almost twice as frequently in the aged as in the young. Hyperpnea likewise represents seriously disturbed physiological processes and is presumably of central origin[4]. Hyperpnea was almost 5 times as common in the elderly as in those under 45 years of age. Although the complications due to the infection itself were exactly equal in frequency in the two age groups, coincidental complications such as heart failure, renal failure, and secondary pneumonia, were 20 times as common amongst the elderly. These factors suggest that the greater mortality after the age of 45 years is produced by the relative physiological unadaptability of the aged to the stress of a severe infection.

PNEUMONIA

Resistance to pneumonia does not necessarily parallel the pneumococcidal power of the blood. Potentially pathogenic pneumococci often inhabit the upper respiratory passages of healthy individuals. It has been demonstrated experimentally that aspiration of infected mucus plays an important part in the pathogenesis of pneumonia. This aspiration is facilitated by failure of the glottal closure reflex.[6] The reflex may be depressed

by anesthesia, chilling, or alcohol consumption. Moreover the development of pulmonary edema in the course of sublethal shock may play an important role in the production of so-called hypostatic pneumonia.[7] The relatively poor temperature adaptability of the aged individual,[8] as well as the likelihood of occurrence of shock in the course of severe trauma, surgical procedures, myocardial infarction, or cerebrovascular accidents probably account for the relative frequency of pneumonia in the older age group.

Of 100 ADULT cases of lobar pneumonia, principally of pneumococcal origin, 58 patients were over 45 years of age. In bronchopneumonia the age differential was even more striking, for 79 of 100 patients fell into the older age category. Acute illnesses or traumata preceded the onset of pneumonia in 11.1 per cent of the younger group, and in 21.9 per cent of the older category. Acute precipitating illnesses were considerably more common in the bronchopneumonia series than in the lobar pneumonias at all ages. Pre-

TABLE III
INCIDENCE AND MORTALITY RATE OF PNEUMONIA BY AGE GROUPS

	Lobar Pneumonia	Broncho Pneumonia
Total Cases	100	100
Incidence under 45 years	42	21
Incidence over 45 years	58	79
Mortality rate under 45 years	4.8%	9.6%
Mortality rate over 45 years	29.3%	60.8%

existing chronic systemic disease does not have as definite a part in the pathogenesis of pneumonia as do acute illnesses, but, as might be expected, was present in 77.4 per cent of the older group as opposed to 41.3 per cent of the younger patients. Congestive heart failure was 5 times as common amongst the aged as in the group under age 45.

The ETIOLOGICAL organisms occurred with similar frequency in both age brackets. Pneumococci were by far the commonest etiological agent in

TABLE IV
INCIDENCE AND MORTALITY RATES OF ACUTE AND CHRONIC PRECEDING ILLNESS IN PNEUMONIA

		Lobar Pneumonia		Broncho Pneumonia	
		Incidence Per cent	Mortality Per cent	Incidence Per cent	Mortality Per cent
Acute preceding illness or trauma	Under 45 years	4.8	0.0	23.8	20.0
	Over 45 years	17.2	60.0	25.3	45.0
Chronic preceding illness	Under 45 years	35.7	13.3	33.3	14.3
	Over 45 years	74.1	23.5	79.9	52.4

all lobar pneumonias, but were a considerably less common pathogen in bronchopneumonia. Thus it appears that the high incidence of coincidental disease or trauma especially of acute nature, is an important factor in the relatively high frequency of pneumonia after the age of 45.

THE INCIDENCE of bacteremia, multiple lobe pneumonia, hyperpyrexia, failure of leukocytosis, and complications due to the infecting organism, as well as the duration of fever, were analyzed to compare the relative severity of infection in the two age categories.

Bacteremia occurred slightly more often amongst the young patients. Lobar pneumonia involving more than one lobe was of nearly equal frequency at all ages. The percentage of patients whose maximum temperature exceeded 104° F. was almost identical in both groups. In lobar pneumonia the average duration of fever in patients who recovered was 6.1 days in both age categories. In bronchopneumonia the average febrile period was 3.6 days in those under 45 years of age as contrasted to 5.7 days in those over 45 years. The incidence of initial white blood cell counts of less than 6000 per cu. mm., a phenomenon usually associated with severe infection,[9] was

TABLE V
SEVERITY OF PNEUMONIA BY AGE GROUPS, SHOWING MORTALITY ASSOCIATED WITH VARIOUS MANIFESTATIONS

		Lobar Pneumonia		Broncho Pneumonia		Both	
		Incidence Per cent	Mortality Per cent	Incidence Per cent	Mortality Per cent	Incidence Per cent	Mortality Per cent
Bacteremia	Under 45 years	49.8	9.9	6.3	0.0		
	Over 45 years	41.1	33.3	6.1	100.0		
Multiple lobe pneumonia	Under 45 years	19.1	0.0				
	Over 45 years	22.4	46.1				
Temp. over 104°F.	Under 45 years	11.9	0.0	19.0	0.0		
	Over 45 years	15.5	55.6	15.2	58.3		
White blood cell count less than 6000 per cu. mm.	Under 45 years	11.9	40.0				
	Over 45 years	15.5	44.4				
Complications of infection	Under 45 years					17.5	0.0
	Over 45 years					14.6	35.0
Coincidental complications	Under 45 years					17.5	0.0
	Over 45 years					11.7	43.8

only slightly greater in the older group. Complications due to extension of infection, such as empyema, meningitis, and bacterial endocarditis were somewhat more common amongst the younger group. Thus, as in meningitis, the severity of the infection, as judged by available clinical criteria, was approximately the same at all ages.

The apparent predominance of complications, both due to infection and

coincidental, amongst the younger group may be misleading. Most deaths in the older group occurred in the absence of recognizable complications. Had these patients survived longer, complications might have been diagnosed. Nevertheless, the death rate associated with recognized complications in the older group far exceeded that in the younger series, and, on the whole the coincidental complications amongst those under 45 years of age were of a mild and relatively insignificant character.

A MARKED difference in mortality existed between the two age groups. In lobar pneumonia only 4.8 per cent of those below 45 years of age succumbed, as contrasted to 29.3 per cent over 45 years of age. In bronchopneumonia the discrepancy was even more evident. The mortality rate of 60.8 per cent far exceeded that of 9.6 per cent amongst the younger individuals.

Meakins and McKenna[10] and Moore et al.[11] have all demonstrated that serious coincidental disease is one of the most important factors in producing a poor prognosis in pneumonia. This has been borne out in this study (See Table IV). Hence it seems likely that the high death rate of pneumonia amongst the aged is more dependent on the inability of physiologically handicapped individuals to survive the added burden of infection than on any increased severity of the infectious process itself in this age group.

DIPHTHERIA

In diphtheria the action of the exotoxin at sites distant from its source is more important than the degree of bacterial invasion at the portal of entry, is more important than the degree of bacterial invasion at the portal of entry, although to a considerable degree the amount of toxin produced depends on the extent of the local lesion. With the exception of respiratory obstruction by pseudomembrane in the larynx or lower respiratory passes, all deaths and most complications of diphtheria are of toxic origin.

Since the earliest available statistics, diphtheria has been principally a disease of children and has been considered most lethal during the early years of life. When diphtheria was a common childhood disease, the vast majority of adults were found to be immune as determined by negative Shick reac-

TABLE VI
INCIDENCE, MORTALITY, AND COMPLICATIONS OF DIPHTHERIA BY AGE GROUPS

	Under 45 Years	Over 45 Years
No. of Cases	104 (70.7%)	43 (29.3%)
Deaths	18 (17.3%)	12 (27.9%)
No. of patients with complications	37 (35.6%)	26 (60.5%)
Myocarditis	24 (23.1%)	17 (39.5%)
Neuritis	8 (7.7%)	12 (27.9%)
Respiratory tract obstruction	16 (15.4%)	7 (16.3%)

tion. This immunity arose following recovery from the clinical disease or from repeated subclinical immunizing exposures to the organism. In the last 20 years, as diphtheria immunization in childhood has become widespread, the incidence of diphtheria in children has decreased sharply. In many localities there has been a simultaneous relative and absolute increase in diphtheria amongst adults. These older individuals have been deprived of the natural immunizing process and have not been artificially immunized.

Thus almost one-third of 147 patients with diphtheria treated at the San Francisco Hospital were over 45 years of age. This is in sharp contrast to Top's[13] statement that 80 per cent of cases are less than 10 years old. The mortality rate amongst these elderly individuals was 27.9 per cent as opposed to 17.3 per cent in those under 45 years of age. This is reflected in the comparative frequency of toxic complications of diphtheria in the two age groups. Myocarditis occurred in 39.5 per cent of 43 older patients, but in only 23.1 per cent of younger persons. Diphtheritic neuritis was diagnosed in 27.9 per cent of the older group as contrasted to only 7.7 per cent of the younger patients. On the other hand, respiratory obstruction, in part, a function of the extent of invasion of the organism, was of approximately equal incidence in the two groups.

Since the degree of toxin activity is also a function of the duration of the disease before the administration of antitoxin, it seemed advisable to determine if the two age categories differed in this respect. In those patients who recovered, the average duration of the disease before treatment with antitoxin was 4.0 days in the younger series and 4.5 days in the older. This difference is not sufficient to account for any discrepancy in the rate of toxic complications in the two age groups. Amongst the fatal cases, however, the older patients had had the disease for an average of 7.5 days before therapy, as compared to only 5.2 days, for the younger group. This difference might, in part, account for the difference in mortality rates.

Thus it is apparent that diphtheria is increasing in both relative and absolute frequency amongst the elderly and that the high rate of toxic complications, and, at least partially, the high death rate can be attributed to the greater susceptibility of the older individuals to the activity of diphtheria exotoxin.

DISCUSSION

From the data analyzed it seems that the high mortality encountered in an older group from infectious diseases is principally due to the fact that the elderly person is not able to adapt himself to severe physiological stress by reason of pre-existing damage to various organs. There is no reason to suspect that elderly individuals are inherently more susceptible to disease because of failure to produce antibodies, or are less able to combat the infection for this reason.

Because of this, investigation of the disturbances of physiological func-

tion in the course of infections becomes increasingly important since future great increases in the antibacterial activity of antibiotics against common pathogens are not likely. Unfavorable effects of infectious diseases on the cardiovascular system have been shown to be common.[14] Serious disturbances in electrolyte distribution are probably frequent as indicated by our preliminary data.[15] That the circulating plasma volume may be significantly altered has likewise been demonstrated in pneumonia.[16]

SUMMARY AND CONCLUSIONS

1. Severe infectious diseases are becoming increasingly frequent amongst the elderly population.
2. The high mortality rate of meningitis and pneumonia in the elderly is due to the fact that the older individual is unable to adapt to the physiological stress of infection because of pre-existing organic disease.
3. Elderly persons do not differ significantly from younger individuals in their protective response to the infection itself.
4. Susceptibility to the action of diphtheria toxin is increased in older persons.
5. Further investigation into the nature and management of the physiological disturbances produced by infection is necessary.

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AMERICAN GERIATRICS SOCIETY 1949 MEETING

THE 6th annual meeting of the American Geriatrics Society will be held in Atlantic City, New Jersey, Hotel Brighton, June 2-3-4, 1949.

FROM THE MEDICAL PRESS

MEDICAL KNOWLEDGE has not advanced far beyond Hippocrates, who said: "Old men suffer from difficulty of breathing, catarrh accompanied by coughing, strangury, difficult micturition, pains at the joints, kidney disease, dizziness, apoplexy, cachexia, pruritus of the whole body, sleeplessness, watery discharges from the bowels, eyes and nostrils, dullness of sight, hardness of hearing." His remark that "old men have little innate heat" might have been taken from a recent article in any medical journal of today. Another Greek writer, who gave an excellent description of the mental changes in later life, was Aristotle. After these two great men, little has been added until recent years. Nearly all the writers in the intervening period have been chiefly concerned with a search for the secret of longevity. Abstinence from food, the breath of virgins, testicular grafting, thyroid extracts, special exercises, sour milk and cytotoxic serum have all, in their turn, been vaunted as the true elixir of life which would prolong man's stay on this earth. It is a welcome sign of the times that doctors are turning away from fantasy and seeking to learn the facts about the process of aging.

A Study of Depressive States in the Aging

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AGING PERSONS are frequently subject to marked states of depression. These depressed states may occur in association with some frankly psychotic or psychoneurotic condition, or they may be less severe in nature and perhaps considered a normal personality reaction in response to adverse environmental circumstances. An elaboration of the nature and meaning of such states of depression occurring in the person past the age of 60 might be expected to prove helpful in understanding and treating him.

Mental symptoms in older persons have often been considered associated with "a wearing out" or a "running down" of the organism, attributed without clear definition to old age. Although organic brain changes which are usually related to cerebral arteriosclerosis or senility may eventually develop, this concept is rather vague in a given person in the absence of the mental symptoms characteristic of organic brain defect. Particularly in the presence of predominantly depressive features it is shown in this study that the mental condition is likely to be functional rather than due to any demonstrable evidence of organic deterioration.

IN A GROUP of 365 patients over the age of 60 who were consecutively admitted to the New York Hospital-Westchester Division from January 1, 1936, to January 1, 1946, various types of mental disorders were represented. Sixty-five per cent of these patients had functional types of mental illness, while only 35 per cent had symptoms usually associated with organic brain changes. The great majority, or 85 per cent, of the organic cases had degenerative mental conditions associated either with cerebral arteriosclerosis or senility. In this group it might be said with considerable certainty that the organism was actually wearing out.

However, in the 237 patients with functional mental disorders the great majority, or 80.5 per cent, were of an essentially depressive nature, without clinical evidence of organic mental symptoms. Then, too, the high incidence of recovery in these depressed patients as well as their subsequent courses after leaving the hospital indicated that organic brain changes associated with advancing years were of little significance in their conditions.

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At the time of leaving the hospital 65 per cent of the typically depressed patients were recovered or much improved, with capacity to live comfortably at home or, in the case of many who had not retired, to return to work. Diagnostically these patients included 75 with manic-depressive, depressive, or mixed states, 46 with involutional psychosis, melancholia, and 16 with psychoneurosis, reactive depression.

THE HISTORIES of the sixteen patients with psychoneurosis, reactive depression, demonstrated well the occurrence of marked functional depressions in the aging with courses indicating the absence of significant organic factors. This group consisted of seven men and nine women, with a median age of 65, of whom the oldest was 79 at the time of admission. Six patients had no history of a previous attack of mental disorder while ten had suffered from one to four previous attacks at some time in earlier life. Ten of the sixteen patients with psychoneurosis, reactive depression, were recovered on discharge while four were much improved, one was improved and none was unimproved. One died of a coronary attack. A follow-up after a median time of two years and four months showed that twelve of the original sixteen had achieved complete recovery with three still working regularly. One man remained recovered at 73 and a woman was driving her own car and carrying on her usual full round of social and philanthropic activities at the age of 82.

It is quite understandable that the social and economic insecurities of old age may precipitate a marked depression due to unfavorable external circumstances in many persons whose mental capacities are relatively unimpaired. It was noteworthy that adequate external precipitating factors were almost always present in the functional depressions. A relative resistance in older people to the development of disabling functional depressive states seemed indicated by the fact that these disorders were seldom sudden in onset but usually occurred after a continued period of stress. This is in contrast to the situation in young people in whom depressive states often come on suddenly from emotional conflicts arising within the personality without apparent relation to adequate causes in the environment. The older person seems better able to benefit from the cultivation of an easier philosophy of life from his experiences of meeting past problems.

McCurdy states: "Depression is perhaps the most important of abnormal emotions because it is the commonest." It is certainly the most frequent symptom of an affective nature associated with functional personality disorders in the aging. Depression is so common a feature at the involutional period that the characteristic psychosis of this period has been termed involutional melancholia.

WHILE DEPRESSIVE reactions may occur at any time of life, those of advancing years are associated with psychological attitudes different from those of youth. This difference appears dependent on the change in balance between two dominant instincts which affect the lives of all human beings.

The first is the instinctive drive toward self-preservation which is associated with growth, development or the formation of protective reactions against hostile influences. On the other hand the individual is also influenced by an interest in race preservation associated with reproduction or propagation of the human race. These drives are in greatest conflict at the periods of puberty and of involution. It is important in this respect to keep the fact in mind that these periods may be premature or delayed in their manifestations and that the physiological and psychological changes pertaining to them are not necessarily concomitant. This lack of synchronization between the physiological and psychological manifestations shows greater variations at the involutional period than at puberty. The psychological changes of involution may come before or long after the appearance of physiological changes.

AT PUBERTY the instinctive drive for propagation is more or less consciously and quickly superimposed upon the previously developed drive for self-preservation. In youth a conflict often arises between these instinctive drives which may lead to extreme perplexity. If the conflict becomes too acute, the person seeks relief in withdrawal from the pressing perplexities of life, avoids the responsibilities of reproduction in various ways and may even build up a delusional defense against them. Such reactions are frequently schizophrenic in character. The prognosis will depend largely upon the degree of affect present. A depressive mood may ensue but the depressions of youth are generally of shorter duration and less severe than those in the later decades of life. Depressed patients admitted to a mental hospital after the age of fifty frequently give a history of having had depressions during or shortly after adolescence which were of short duration and from which they recovered after a few weeks' rest without hospital treatment.

The youthful person can live in hope of the future. There is also more physical vigor and associated psychic energy with which to attack the immediate problems of the environment which can be invested with greater zest and present a greater novelty than in later years. He may make many failures in his psycho-sexual adjustment but has hope for better adaptation in the future. As he becomes mature his increasing exactions and responsibilities offer powerful and helpful stimuli to keep his interests extroverted and to prevent painful self-analysis.

AT THE involutional period and later the more or less adequate adjustment which has been maintained between the instinctive forces of self-preservation and race preservation may require a thoughtful readjustment. As the instinctive drive for race preservation abates, sometimes reluctantly, the more fundamental drive for self-preservation again asserts itself more consciously. The person at this time begins to appreciate and often fear that he is not only aging but becoming less adequate. He fatigues more easily and it takes him longer to recuperate. Becoming increasingly aware of and concerned about himself, he often has less interest and affection

available for others. As he ages, those who have previously aided and abetted him become fewer through death, while those remaining likewise become more concerned with themselves and he finds himself more or less alone.

THE AGING person has adjusted for so many years to life's realities that he is still conditioned to do so. As a result instead of withdrawing from reality with a schizophrenic splitting of his personality, he becomes depressed. In other words, if he develops a personality disorder at this age, it is more apt to be associated with a certain degree of extroverted rather than completely introverted defense. In his overwhelming depression he may use his physician as a kind of liaison with the external environment. Dependence on this relationship is commonly seen in concern over the whereabouts of his physician, where he will be and whether he is going away, and reassurance that he will soon be able to see the patient again. The patient may be unable to say very much when interviewed but he often indicates that the doctor seems to understand him.

The depressions of the aging, especially at the involutional period, are more severe in character and more prolonged than in younger persons because of the rigid exactions of the life situation. As Stein and Menzer so well point out, "The young person always has a choice in questions of vocation and personal allegiance. Past the climax of life the person finds himself suddenly facing all irreversible situations."

Many patients who show intermittent neurotic manifestations in earlier years continue to maintain a successful economic and social adjustment until the seventh, eighth or even ninth decade of life and then react with a depression for the first time after a physical illness which in earlier years would not have disrupted their emotional balance. The following case history summary indicates how a physical illness produced such a reaction and how the illness served as a defense against returning to an environment where the patient felt he would be without the protection of his former compensations.

A MARRIED man of 72 was admitted to the New York Hospital-Westchester Division for treatment of an agitated depression. He came from a long-lived family beset with many emotional conflicts and several resulting suicides. While his formal education terminated with his high school graduation at 18, he had a wide range of interests and read accordingly. For 24 years he earned a nominal salary in a small town bank. Then at 45 he suddenly displayed an ambitious drive. Through studious application he headed the list of appointments to a more lucrative position. Always of frail physique, he now developed a severe sciatica and "a pen paralysis." Instead of giving up in despair, he learned to write with his left hand. He was a successful financial official for 25 years until his retirement at 70. But there was enough energy left for him to seek further employment although in a more flexible capacity.

For thirteen years previous he had suffered from a spastic colitis. At 65 he had a transurethral prostatectomy with an excellent result. At 68 he had a brief spell of confusion, possibly cerebral-vascular in origin, but diagnosed by a competent physician as hypoglycemia. There was no recurrence and afterward his sensory perceptions remained accurate.

FOLLOWING his marriage at 24, his adjustment to his wife of a different social strata had been one of duty rather than love. However, he had many compensatory gratifications: sports in younger years; and from sixty to seventy, although he took things a little slower in view of the physical complications mentioned, he led a happy existence, commuting to his work, becoming a patron of the theatre, having a congenial mistress and often feeling exhilarated evenings from one or more highballs, but allowing none of these to interfere with his work which necessitated a certain amount of traveling.

A month after his seventy-second birthday, he was afflicted with a severe naso-pharyngitis and a phlebitis. He complained of fatigue and became depressed. His physical illnesses soon subsided and he returned to work for eight months, but he did not recuperate as before, lost his ambitious drive and thought he was through. His food lost its savor, he no longer "got a kick" out of highballs, and a waning of potency caused him to sever amicably with his mistress. He slept intermittently, often falling asleep in his chair. He was now fixed in his home under the dominance of his more active wife. He gave up work, developed a remorseful, anxious, suicidal trend and entered the hospital.

His agitated depression lifted following seven electric shock treatments and he returned home four months later much improved. But again under the dominance of his vigorous wife, his depression recurred. He returned to the hospital within three months and has remained (since) aside from week-end visits to a relative's home. Occasional electric shock treatments keep him at a fairly comfortable emotional level, although he contemplates any return to his wife with feelings of reluctance and remorse, now that he is becoming more physically incapacitated so as to preclude his former compensations.

UNTIL HIS present emotional illness, this patient had suffered from various physical and neurotic symptoms which were reversible in character and accompanied with sufficient physical and mental energy to enable frequent escapes from his inadequate marital adjustment. But now in his early seventies, he shows evidence of a rigid senescence. This was precipitated by relatively simple physical illnesses, naso-pharyngitis and phlebitis, which in earlier years would not have been followed by his present permanent physical limitations and unalterable psychic conflicts.

In the group studied from this standpoint the deep depressions prominent in aging patients with functional psychoses were in contrast to the

comparative infrequency of marked depressions in the patients suffering from psychosis with cerebral arteriosclerosis and senile psychosis.

The presence of depression as an outstanding symptom appeared to show a definite correlation with the degree of organic mental impairment present in these patients. While definite evidence of depression was noted in two-thirds of the 76 patients with cerebral arteriosclerosis, it was noted in only three of the 33 patients with senile dementia. Some mild depressive phases, of course, were noted in other patients of both groups but the periods were ephemeral and were more frequent in the patients with cerebral arteriosclerosis, who generally had better personality preservation than the more deteriorated patients with senile psychosis. In this regard it was noted that of eight patients with cerebral arteriosclerosis who showed definite suicidal trends, the depression and suicidal inclinations of one disappeared as she became more deteriorated. Such cases are not infrequently encountered.

In the most deteriorated patients the outstanding emotional response was irritability rather than depression. Irritability was the prominent emotional feature in ten of the 76 patients with cerebral arteriosclerosis and in nine of the 27 patients with senile psychosis. Six of the patients with cerebral arteriosclerosis were essentially fearful. Suspiciousness was outstanding in nine of the patients with cerebral arteriosclerosis and in three with senile psychosis.

It is as though nature protected the individual by rendering him less sensitive to overwhelming depressive feelings as he became more deteriorated and impotent; five arteriosclerotic patients were in a prevailingly cheerful mood and several, including arteriosclerotic and senile patients, were in a state of apathy or complacency. Perhaps the effect of marked degenerative changes in the brains of patients with organic psychosis of old age in reducing depression and agitation can in a sense be compared with the deliberate organic alterations produced in lobotomy and the temporary alterations found after electric shock therapy which are employed as therapeutic measures usually in younger persons suffering from such depressive symptoms.

SUMMARY

A discussion of depression as it occurs in the aging is presented. A predominantly depressed mood was present in 220, or 60 per cent, of the 365 patients past the age of 60 who were admitted to the New York Hospital-Westchester Division during the ten-year period from January 1, 1936, to January 1, 1946. Various diagnostic categories were represented.

One hundred and ninety, or 85 per cent, of the patients with functional types of mental disorder were primarily depressed. Only 27 per cent of the patients with psychosis with cerebral arteriosclerosis, or senile psychosis associated with organic brain changes of advancing years, showed a conspicuously depressed mood although ephemeral periods of depression were present in many of the others. A correlation appeared present in the

organic group studied between the degree of depression and the amount of mental deterioration present. One-third of the patients with psychosis with cerebral arteriosclerosis had predominant depression of mood, whereas in the generally more deteriorated group with senile psychosis, less than one-tenth had a predominantly depressive effect. As is frequently observed, a consistently depressed and suicidal patient suffering from psychosis with cerebral arteriosclerosis became complacent as mental deterioration progressed. In the deteriorated organic patients irritability was the most prominent emotional expression.

THE CAUSES, severity and duration of depressive states occurring in the aging is discussed and contrasted with the occurrence of such conditions in younger individuals where abrupt depressions of short duration not infrequently develop which may not require hospitalization. The characteristics of depression at various ages are determined in a broad sense by factors associated with the changing nature of adjustment to what may be conflicting drives between self-preservation and race preservation or the sexual instinct. The influence of the resources of the aging individual with regard to social and economic factors is emphasized. An illustrative case history is also included.

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LIFE EXPECTANCY OF PHYSICIANS

THE Metropolitan Life Insurance Company tells American physicians how long they may expect to live. At age 25 the average male physician has a life expectancy of 68.54 years; at age 35, 69.21 years; at 45, 70.48 years; at 55, 72.86 years; and at 65, 76.87 years. This expectancy of life is essentially the same for the average male. At age 25, the life expectancy is about one quarter of a year greater than for the average of all other white males in the United States. At age 35, the physician loses this slight advantage and his prospective lifetime becomes somewhat less than the expected life of the male of the general population. However, at no time are the chances that a physician will live less than one year than the average male.

A Restoration Program for Hip Fractures

Spencer T. Snedecor, M.D.*

MODERN treatment of fractures in the aged goes far beyond the simple mechanical achievement of accurate reduction and fixation. Our hope and common achievement today restores to the individual comfort, usefulness and happiness. Early ambulation, special nursing care, replenishment of fluid balance and meticulous steps to combat osteoporosis, prevent embolism, support morale, and attention to numerous other details, often make the difference between success and failure in salvaging and rehabilitating the elderly person with a fractured hip. No greater crisis occurs in the aged.

The most common, as well as the most serious, fracture in old people occurs in the neck and trochanter of the femur, and at least five out of six of these individuals are women. In our three hundred bed general hospital about one hundred such cases in people over 70 are admitted each year. Not so long ago the outlook for these patients was dismal. Hopeless deterioration and handicap followed a large percentage of patients, even after a Whitman reduction and the application of a plaster spica with three months or more of torture in bed.

The renaissance of hip fracture treatment began with Smith-Peterson's popularization of nail fixation. To be successful, this method demanded accurate reduction of the fracture, and this was obtained when a satisfactory technique for lateral X-rays of the hip was devised. The Leadbetter method of reduction has been generally adopted, and in most instances is successful.

It is not the purpose of this paper to cover the various modifications and methods in vogue for mechanical fixation of the hip. Our own procedure remains as simple as possible. After an accurate reduction is proven by X-ray, a small lateral incision is made and the nail is started and corrected once or twice as the X-rays indicate. No guide wire is needed. In oblique fractures across the neck or at the base of the head, the fragments may be transfixed with a temporary Kirschner wire to prevent rotation during the nailing. Emphatic impaction is always carried out as the final step of the fixation.

THE MOST recent achievement in the surgical technique for hip fractures enables us also to obtain rigid fixation for intertrochanteric fractures, by combining a grip on the neck and head with the usual Smith-Peterson nail-

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ing together with a firm hold on the shaft by a downward extension plate that is firmly fixed to the shaft by screws. This new and additional method now assures nearly every individual with a fractured hip, who comes into our hospital, the opportunity to have the fracture reduced and set immediately by some mechanical arrangement through a relatively non-dangerous operation. Anesthesia is kept as light as possible, as well as the preliminary sedation. A small amount of pentothal sodium supplemented by gas-oxygen is quite satisfactory. In the more feeble cases most of the procedure can be accomplished under local infiltration with an occasional inhalation of gas-oxygen. It is best to have the patients awake when they return to bed. The shock of the surgical procedure in our hands has proven to have so little hazard that it is only in rare instances that we are unwilling to go ahead.

THE ADVANTAGES of immediately "fixing" a fractured hip are numerous. The patient's pain is relieved; early ambulation is possible; reasonable hope of union and weight bearing is gained; and the encouragement in morale is striking. Thus the basic opportunity is created not only for the preservation of life in these elderly patients but also for the re-establishment of useful function. From the surgical foundation it has become evident that we can build an active program of rehabilitation. Herein lies the most modern phase of treatment in geriatric fractures.

PROGRAM STEPS

1. Morale building is begun at the time of the first examination, with continuous encouragement to the patient. The program is explained to her carefully in detail, stressing particularly that the hip will be fixed quickly; that soon thereafter she will be up in a chair and will be able to leave the hospital within a comparatively few days to go home.
2. Immediate traction and mild sedation are initiated on entering the hospital for the relief of pain and to gain relative comfort.
3. Early operation is desirable, within the first 24 hours if possible. It is our opinion that these elderly people will never again be in such good condition as they were at the time of the fracture and the longer the delay in reduction and fixation, the poorer their resistance becomes. A careful physical examination and an immediate urinalysis and blood count are usually all the precautions that are necessary to carry out before the operation. If the blood is down a small transfusion is helpful.
4. Early post-operative ambulation means that, in most instances, the patient is lifted out into a wheelchair the same afternoon of the operation, if only for a few minutes. This encourages her because it proves to the patient that our word is being kept and that she will soon be up and around. From then on the activity program increases each day.
5. Dehydration is a problem with elderly patients. Fluids must be forced to combat the handicap balance. At least 3,000 cc. of fluid should be given the first few days. These people do not drink liquids in quantity and frequent infusions are necessary to achieve this total. On the foot

of the bed we have an Intake and Output Chart for the nurse to record the fluid exchange.

6. Diet. These patients lose their appetites at once and large meals are especially distasteful and unattractive to them. We have been much more successful in getting them to eat six small meals a day.
7. Anemia is best corrected by transfusions. Iron and Liver are too slow and an extra nuisance to be taken by mouth.
8. Vitamins. The usual vitamin deficiency is always present and one multivitamin capsule a day is given to correct this.
9. Calcium is another deficiency item of old age. In order to provide an excess of calcium in the diet and an adequate concentration in the blood, three wafers of dicalcium phosphate are supplied each day, unless they will drink three glasses of milk. But we have found that old people as a rule do not like milk.
10. The negative protein balance must also be counteracted actively. This state is relatively common in elderly folks under normal circumstances. After fractures it becomes exaggerated and therefore must be seriously combated. Snapper has emphasized that correction can be obtained by forcing estrogen in some form to stimulate the re-absorption of calcium from the blood back into the bones. Stilbestrol in doses of 3 mg. daily is the cheapest and most satisfactory drug to administer if tolerated.
11. Prevention of embolism is a factor of tremendous importance, particularly in the intertrochanteric fracture cases where the mortality risk from this fate is extremely high. Our plan for meeting this challenge carries on as follows: Active and passive exercises of the feet, carried out frequently thru the day by the nurses, internes and attending staff. No pressure is allowed under the popliteal area. Early ambulation and active use of the legs are encouraged. If any vein tenderness or positive Homan's sign (tender calf on dorsi-flexion of the foot) appears, dicumarol in the amount of 300 mg. daily is begun. This is checked by a daily prothrombin time which should be kept above twenty.
12. Sealing the wound well with adhesive prevents contamination. The sutures are removed in about 10 days. Occasionally if there has been quite a lot of bleeding, a drain is inserted but this must be withdrawn within 24 hours.
13. The bowels are regulated with simple cathartics or enemas.
14. Loss of bladder control and the consequent bed wetting almost inevitably develops early pressure sores. This can be prevented in large measure by using an indwelling catheter of the small Foley type. We have found this a measure of great nursing assistance in perhaps half of the cases. A dry patient is a much happier and better patient.
15. Special nursing care requires that an extra effort be made to enlist the interest and enthusiasm of the nursing staff who take care of these old patients. By proving to the nurses that so much can be done for their

patients and that the nursing problems can be made easier by carrying out this program, their active co-operation can be secured. They are told to encourage the morale of their patients at every opportunity and to urge the patients to help themselves in every way, especially to change their position frequently. Great emphasis is placed on the precept of forcing the patient gently but firmly to do things actively herself. Furthermore, the patient must be kept dry; the head of the bed elevated; and the bed clothes must be loose over the legs and feet to permit free exercise. Truly the nursing staff carries the principal burden of these many phases of early ambulation and rehabilitation. Without their enlightened support the program fails.

16. As soon as the operation is over the recovery steps are reviewed with the patient and her family, and her release from the hospital is anticipated in between 5 and 10 days. Sometimes this is held up by family problems, but rarely does the patient need to remain in the hospital longer than seven days post-operatively, except by choice. A typewritten outline of this program is prepared as a guide for the family physician to review during the home care.
17. The progress of the patient's recovery develops on a rapid scale; from bed to the wheelchair at once; from the wheelchair to the walker as soon as she can balance; and from the walker to the crutches as rapidly as her strength permits. No weight bearing is advised until X-ray evidence of bony union, and we like to re-check them at two-month intervals. Frequently, however, in these feeble old people we have found that a little weight bearing gives them a lot of encouragement and, in fact, some of them cannot use crutches without doing so. To our surprise no apparent disastrous results seem to follow, and we have suspected for a long time that only a few of our patients keep to strict non-weight bearing after they get home.

CONCLUSION

Fractures of the hip in the aged are no longer an occasion for despair. With early reduction and operative internal fixation the patient can be ambulated and nursed back to health. A multitude of painstaking steps and attention to the innumerable details of the program outlined assures successful recovery in a very large percentage of these cases.

Reduction of Surgical Risk in Operations on Elderly Patients

J. Dewey Bisgard, M.D.*

LIFE INSURANCE records and vital statistics show that every year more people are living longer and into the age of degenerative diseases so that geriatric surgery, which already is a large field, is constantly becoming a larger one. The degenerative diseases not only pose certain peculiar surgical problems, such as arteriosclerotic gangrene of the extremities, but they also complicate other surgical conditions and contribute hazards not encountered in younger individuals. For this reason, every detail in the surgical management of elderly patients, beginning with the history and physical examination and including the anesthesia and pre and post operative care must be meticulously carried out. In this age group there is a greater need of teamwork between the surgeon, internists and other specialists and a greater challenge of the surgeon's ability, particularly his judgment. One cannot get by with compromises as in younger patients.

First, let us define the term, elderly patients. For no good reason one draws an arbitrary line and includes everyone over a certain age. Many draw that line at 60; others would place it at 70. In reality in dealing with patients we think of age on a physiological basis rather than a chronological one and are cognizant of the fact that some men are old at 50, others young at 70. The physiological age is determined by the functional capacity of the various organs and tissues and is reflected in the general appearance of the individual, the way he moves, his color, texture of skin, the condition of his blood vessels, his mental acuity and more specifically in the tests used to determine the functional capacity of his organs. Most surgeons, I am sure, prefer to assume the operative risk of a slender man of 70 who is physiologically young to that of a puffing, obese, plethoric patient of 40 whose lips are cyanotic and chest emphysematous.

ONE MUST always be mindful of the fact that in elderly patients the history is likely to be inaccurate and misleading because old people are forgetful, and in aging there is a progressive loss of perception. It is not uncommon to find an appendix abscess or some lesion usually associated with much distress in an old man who insists that he has had no appreciable discomfort.

The preliminary examination must be thorough and nothing assumed or left to chance. It should include an estimate of the functional capacity of

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the organs, particularly the cardio-vascular and renal systems. Ideally, this should be done by an internist and certainly, the opinion and help of an internist should be had in all cases in which there is evidence of degenerative heart, renal, cerebral or hepatic disease.

Because with aging there is a loss of reserve potential of all organs and tissues, there is a greater need of complete preoperative rehabilitation. It was from the elderly patients, the old men with prostatic obstruction that we first learned the importance of preoperative preparation. In early days of prostatic surgery, there was a mortality upward from 50 per cent and this was acceptable on the basis of age. Then it was learned that these men died not of their age but of renal failure and infection brought on by the period of urinary obstruction and that these hazards could be eliminated by pre-operative preparation.

MOST ELDERLY people are relatively undernourished. People eat less as they grow older. Less food is required to take care of their reduced activities and lower levels of metabolism. But this is not important. What is important is the fact that weight is lost at the expense of stored fat, glycogen and available protein, the nutritional reservoirs which are called upon in periods of starvation and times of stress. Consequently, the fasting or inadequate alimentation associated with disease and that normally occurring with operations rapidly depletes their reserves. It is common in elderly patients to see clinical evidence of protein deficiency in the form of edema of the viscera, the stomach and bowel and of the extremities particularly after getting out of bed and often in the presence of a normal plasma protein.

The presence or early development of a protein deficiency must be anticipated in therapy. Insofar as possible and insofar as time will permit, protein deficiency should be corrected preoperatively and prevented postoperatively. This means the supplying of protein in excess of the normal daily requirement of about 1 gm. of protein for each kilogram of body weight, that is 50 to 100 gms. Under conditions of trauma, burns, infection and after operations, the breakdown of proteins is increased and the daily requirement may be two or three times larger than normal. Carbohydrates and fats spare proteins but proteins can be replaced only by proteins.

REPLACEMENT is best accomplished by the oral route but often this is not possible and one must resort to the parenteral administration of plasma and amino acid mixtures. One liter of plasma contains 60 gms. of protein and is to be preferred over the amino acids except that its cost makes its use for nutrition prohibitive in most instances. The amino acid solutions contain 50 gms. of the amino acids per liter so that two liters will supply an excess of the daily requirement. An additional 100 gms. to 200 gms. of glucose will provide a total intake of 800 to 1000 calories.

The elderly patients should be maintained in relative water and electrolyte balance, but particular attention must be exercised to avoid overhy-

dration. It is safer to stay on the dry side. All fluids should be administered much more slowly and with more caution than in younger people because the heart is less capable of handling a sudden increase in blood volume. Also a word of caution should be injected about the use of salt solution in the aged. If there is any evidence of impaired renal function, lactate Ringer's solution should be used in place of salt. There is the likelihood of salt retention and this alone or associated with protein depletion, low cardiac reserve and retarded tissue exchange results in rapidly developing edema; and the wet lungs cause alarming if not fatal respiratory embarrassment.

In elderly patients there is a more pressing need for transfusions to replace blood loss and to maintain normal blood values. This is so for two reasons: first, their tissues are unable to survive much reduction from the normal supply of oxygen and second, the bone marrow has a much reduced capacity to replace blood loss.

There are two lesions common to all adult age groups which present specific problems in the elders, acute cholecystitis and internal hemorrhage—particularly gastro-intestinal bleeding.

In most individuals under 50 years of age, acute cholecystitis subsides within a few days and a conservative course can be followed reasonably safely. On the contrary in most elderly patients, the disease progresses to gangrene of the gallbladder and perforation, so I am convinced that immediate or early operation—cholecystectomy or drainage should be done.

In elderly individuals blood loss is not well tolerated and because of arteriosclerosis hemorrhage is more likely to continue to exanguination so that its management demands more radical treatment.

POPULATION BY BROAD AGE GROUPS, FOR THE UNITED STATES, FOR 1945 AND FORECASTS 1950 TO 1970
MEDIUM FERTILITY—MEDIUM MORTALITY—500,000 NET IMMIGRATION PER FIVE YEARS.

	Population in Thousands						Per Cent Distribution					
Year	All Ages	Under 5 years	5-19 years	20-44 years	45-64 years	65 yrs. & over	Under 5 years	5-19 years	20-44 years	45-64 years	65 yrs. & over
1945	139,621	13,147	33,648	54,186	28,530	10,110	9.4	24.1	38.8	20.4	7.2
1950	145,959	12,150	35,910	56,081	30,685	11,193	8.3	24.6	38.4	21.0	7.7
1955	150,911	11,199	38,127	56,390	32,603	12,592	7.4	25.3	37.4	21.6	8.3
1960	155,075	10,866	38,662	56,808	34,746	13,993	7.0	24.9	36.6	22.4	9.0
1965	159,055	11,137	36,311	59,411	37,015	15,181	7.0	22.8	37.4	23.3	9.5
1970	162,888	11,447	35,288	60,336	39,411	16,404	7.0	21.7	37.0	24.2	10.1

The Choice of Anesthesia for the Elderly Patient

Laurence D. Ruttle, M.D.*

SINCE THE average age of patients with whom we have to deal surgically is rising rather rapidly, the choice of the anesthetic agent and procedure for elderly patients is becoming increasingly important. During the past year, anesthetics were given to 6,255 patients at St. Luke's. Six hundred and sixty-eight were 60 years or older. It is the purpose of this paper to present some of the broad fundamental principles involved. I should like to emphasize that the choice of anesthetic is primarily up to the individual anesthetist and individual techniques are relatively unimportant in themselves. All of the care and experience which goes to make any anesthetic procedure safe for the patient and suitable for the surgeon must be redoubled in geriatric anesthesia.

Although each patient must be treated as an individual, three factors enter into the choice of agent and method in every case:

(a) safety for the patient
(b) convenience to the surgeon
(c) comfort of the patient

The ability of the body to tolerate physical injury decreases with increasing age after the third decade of life. The anesthetist dealing with the aged must be acutely aware that they have a decreased resistance to the direct and indirect action of anesthetic drugs. The profound alteration in the circulatory and respiratory systems resulting from anesthesia and surgical trauma may sorely tax the cardiovascular and respiratory systems of these debilitated patients. Planning of the anesthetic management should be done as far in advance of the actual operation as possible. Only by weighing all of the factors involved can a successful conclusion be reached. In spite of careful assessment and preparation of the patient, unexpected complications must be expected and preparations made to meet them.

DISEASES of the respiratory and cardiovascular systems are the most important from an anesthetic point of view. Functional capacity rather than disease entities is the major consideration. History of typical anginal attacks, coronary occlusion, asthmatic attacks, cardiac decompensation, chronic cough, sinusitis, chronic anemia, malaria, syphilis, central nervous system disease are among the important disabilities to look for. The ability to hold the breath unrehearsed and to walk up one flight of stairs without pain or shortness of breath gives a great deal of valuable information.

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Severe angina indicating a very low coronary reserve is one of the most severe disabilities with which we have to contend because the slightest degree of hypoxia may precipitate a coronary attack. Bronchial asthma with emphysema is another condition which taxes the ability of the anesthetist because of the low vital capacity. Induction and emergence are slow in these cases.

ELDERLY patients require very small amounts of preoperative sedation. In many of our cases, no morphine or morphine-like compounds are given. The deeper the anesthesia required the less the premedication that is given. Usually a small dose of a short acting hypnotic such as pentobarbital given the night before operation will be sufficient to give a good night's rest. Approximately 75 to 90 minutes before the contemplated operation, a small dose of morphine is given with scopolamine or atropine in a 25:1 ratio. The preanesthetic medication serves three useful purposes. The opiates reduce the psychic and emotional disturbances and decrease the reflex metabolic activity. The scopolamine and atropine diminish the salivary and bronchial secretions and some of the deleterious reflex effects of the general anesthetic agents. The drying effect of scopolamine is greater than that of atropine, but it is a depressant and occasionally causes cerebral confusion especially in the aged. Atropine is a cerebral stimulant. Some anesthetists prefer to substitute demerol for morphine because the former is less depressant in doses with equivalent analgesic effect.

In the administration of general anesthetic agents, special care must be taken to provide the best possible airway because elderly patients do not tolerate hypoxia from any cause as well as those in the prime of life. The endotracheal tube is a useful means of attaining this end. A certain degree of training and dexterity is essential for intubation without unnecessary trauma and risk to the patient. The increased safety to the patient makes the effort well worthwhile. In those cases where the surgeon and the anesthetist are sharing the same field such as in surgical procedures on the head and neck, it is almost obligatory. Relaxation of the jaw and throat muscles especially in edentulous patients may obstruct the pharynx. Even minimal obstruction is potentially dangerous. Where obstruction is already present as in Ludwig's angina, one must obtain a good airway before the anesthetic is begun even if this means performing a tracheotomy. The use of techniques where high oxygen mixtures can be employed is advantageous in most of these cases. Oxygen should be given when spinal or local blocks are used in debilitated, elderly patients.

IN ORDER to produce conditions which will allow the surgeon to complete the operative procedure as thoroughly and quickly as possible, certain essentials must be present as far as the anesthesia is concerned. Relaxation, quiet respiration, the ability to use a cautery or x-ray safely, non-encroachment of the anesthetic equipment on the operative field are a few of the problems which must be faced.

Several methods produce adequate relaxation. Curare which is a relatively new drug relaxes skeletal muscle specifically. It can be used with cyclopropane, nitrous oxide, ether, pentothal or ethylene or with various combinations of these. Deep ether and cyclopropane anesthesia, especially when an endotracheal tube is used, will give good relaxation but sometimes this produces marked adverse circulatory effects. The use of spinal anesthesia which gives excellent muscular relaxation and maintains the tone of the bowel at the same time, has been made safer and suitable for more and more cases by the introduction of the continuous or intermittent methods. This technique allows the anesthetist to give small doses of the spinal anesthetic agent which will just meet the requirements of the patient. The tolerance of patients varies tremendously. An outgrowth of this method is the segmental technique where ideally only the area of the body subjected to the surgical procedure is rendered analgesic and relaxed. Many anesthetists believe spinal is the anesthetic of choice for cases with cardiac decompensation and many hesitate to use it in the presence of severe coronary disease and marked hypertension.

QUIET respiration is important where the surgical intervention involves the chest and upper abdomen. A perfectly unobstructed airway with or without controlled respiration makes this possible.

In order to undertake many surgical procedures, cautery is necessary to control bleeding. Since only the block agents, curare, avertin, pentothal, and nitrous oxide are non-flammable or will not decompose in the presence of a flame, combinations of these must be used where a cautery is required. Pentothal and nitrous oxide combination is the most popular at the present time. Most patients tolerate this method very well especially if a minimum of pentothal is used. They are usually awake at the end of the operation and this is important because they should be moved from side to side and encouraged to breathe deeply as soon as possible.

REGARDLESS of the type of anesthetic given or the method used to give it, careful regulation of the fluid balance must be maintained. A young healthy adult can compensate for the loss of 1000 cc. of blood. An elderly person cannot do so. At the same time if the administration of fluids is overdone pulmonary edema or even speed shock may result. Qualitative as well as quantitative replacement is necessary. Blood must be given to replace blood lost. A severe fall in blood pressure should be remedied early because if it lasts too long—for example less than 70mm mercury systolic for more than 30 minutes—there may be irreparable capillary damage with resultant irreversible shock. Even a sudden fall of short duration may slow up the coronary flow enough to initiate a thrombus on an atheromatous plaque. The complete occlusion may not occur until some hours later.

At all times, the patient should be made as comfortable as possible provided it does not jeopardize his safety. It seems to me that the use of

pentothal is being overdone when it is used routinely for a pleasant induction. The same may be said for avertin. They are splendid for the hyperirritable or alcoholic patients, but I believe that their routine use will lead to trouble. If they are used, some other true analgesic agent should be given to supplement them.

In this rather short space of time, an attempt has been made to emphasize some of the fundamental ideas underlying the choice of anesthetic agent for the elderly patient. Because time would not permit and because no useful purpose would be served, specific details of procedures have been omitted.

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ENGLISH GERIATRICS SOCIETY MEETING

The Society met at St. John's Hospital, Battersea in October. The proceedings were concerned with a demonstration of cases of arthritis by Dr. Trevor Howell. Most of the patients under his care had been treated by intra-articular injections of procaine lactic acid followed by manipulation of the affected joints. In addition, physiotherapy and occupational therapy had been employed. Some of the cases showing loss of weight had been given BENECOL, an intestinal extract made by Benger's. This had caused considerable improvement with gain of weight and subjective amelioration in nine out of a series of ten patients used for clinical trial. There was sometimes a feeling of nausea, flatulence or abdominal discomfort after a period of administration, but this was seldom severe.

This preceded a discussion on the organization of a Geriatric Unit. Dr. Wilson described the progress which he had made since his appointment as County Geriatrician in Cornwall. Dr. Adams, who had been working in Belfast, mentioned that the unit which he was trying to form was in danger of becoming a dumping ground for unwanted chronic sick from the general medical and surgical wards. Dr. Marjory Warren urged the need for keeping Geriatric Units solely for the aged sick. To admit every unwanted patient was to block valuable beds and to hinder important work.

It was decided to bring to the knowledge of the B.M.A. committee on the care of the Aged and Infirm the great gap between the healthy and sick old people under recent legislation. Dr. Marjory Warren and Dr. Andrews were commissioned to prepare a statement on this subject.

Late After-effects in Nephrectomized Individuals

Joseph T. Freeman, M.D.*

DYSHARMONY IN symmetrical organs may or may not give rise to disturbances of physiological balance. The knowledge that one of a pair of organs is functionless or extirpated may be accompanied by some apprehension on the part of the patient. Ignorance of such deficiency, which has occurred normally in patients in whom unilateral agenesis is found accidentally at autopsy or operation is associated with no particular pattern or attitude, unless involvement of the potential twin is of such nature as to present the picture of the characteristic disturbance of both. The surgical removal of an adrenal gland, a testicle, or an ovary, rarely is disquieting after the concept of compensatory function is explained. This reassurance is less treasured in the case of nephrectomy and possibly with some justification. However, a sequence of three patients many years after nephrectomy was so encouraging as to stimulate a review of the situation.

In one Philadelphia hospital in 1945 there were 5000 admissions with but one nephrectomy. The following year the census was up by two hundred and there had been three such procedures. In another institution with 4812 admissions there were ten nephrectomies in the earlier year, and in the following year with 6352 admissions, but six nephrectomies. In a third institution with 7000 admissions there were but three such procedures and in the following year with an additional 1000 admissions, only six. Thus in a total of over 35,000 hospital admissions in three general hospitals in Philadelphia, there was a total of 29 nephrectomies in a two-year period. The relatively small percentage of this major surgical effort makes these patients of increasing interest. All the patients were private, ambulatory, enjoying good health, and they permitted such studies to be done as will be indicated. Although undoubtedly more could have been done with hospitalization, it is still felt that a fairly good insight was obtained with the office routine that was used.

THE FIRST patient was a white lady of German descent, seen first in 1943 at the age of 59. At that time a routine examination revealed a blood pressure of 200/80, there being quite a degree of emotional stress due to the recent loss of a sister from carcinoma. A slight systolic apical murmur was also noted. A week later the pressure was 158/90 on mild sedation alone. Seen

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periodically since that time her pressure never attained the elevation of the first examination and remained rather constantly at a level of 160/90 with the exception of certain times when there were vasomotor disturbances when there would be an elevation of 20 mm. of mercury in the systolic figure and 10 mm. elevation in the diastolic. Her essential medical history was that in 1916 during pregnancy it was noted that there was a supra-imposed mass in the left upper abdominal quadrant which became progressively larger as the months of pregnancy followed. After delivery of a normal male child, left nephrectomy was done at which time a "huge mass like a bag of water big enough to fill a wash basin" was removed, and there was a normal recovery from the procedure. It would seem that there had been a progressive impairment of the left ureter with the development of a huge hydronephrosis. There are no major factors in the subsequent history of any moment except possibly a rather severe menopause. No blood pressure recordings relative to the pregnancy could be obtained.

The routine of laboratory studies in this patient was as follows:

Sedimentation Rate	21 mm. in one hour
Blood Sugar	112.0 mgm. %
C.B.C.	
Hemoglobin	13.0 grams
W.B.C.	9,800
R.B.C.	4,600,000
Differential	
Polys seg.	68%
Lymphs	32%

Mosenthal Test revealed a range of specific gravity of 1.002 to 1.012 with a greater quantity of urine being passed in the sleeping hours. The blood cholesterol was 320 mgms. per cent and esters, 31 per cent. The electrocardiogram showed a left axis deviation with inversion of the T-3. The ST interval was 0.26 seconds.

THE SECOND patient is a 74-year-old white woman who was examined for a bleeding vaginal mass. In the history it was revealed that in 1906 she had noticed a progressive abdominal swelling which, she was told, was a cyst for which exploratory laparotomy was done. At a second operation the left kidney was removed. Aside from seasonal pollinosis she had lived a normal life without incident until the development of the vaginal distress a year before this examination. Her blood pressure at this time was 170/96 and subsequently 140/90. She was referred to Doctor L. Kraeer Ferguson who operated upon her under pentothal anesthesia, excising the large papilloma which seemed to arise from the clitoris and also electrocoagulating a suspicious area on the right labia. The pathological report of this specimen showed a squamous cell carcinoma. There was also an area of senile keratotic change on the right vulva. Her convalescence from this procedure

was normal in all respects and the patient returned to her duties as a female companion.

A month after the operation a routine of studies was done as follows:

Sedimentation Rate	14 mm. in one hour
C.B.C.	
Hemoglobin	13.0 grams
R.B.C.	4,280,000
W.B.C.	9,700
Differential	
Polys	51%
Lymphs	46%
Eosins	3%

The Mosenthal Test revealed a range of specific gravity of 1.004 to 1.020 with a normal sequence of output. The blood cholesterol was 300 mgms. per cent, and esters, 33 per cent. The electrocardiogram revealed left axis deviation with inversion of T-3. The ST interval was 0.28 seconds.

THE THIRD patient was a 54-year-old white woman who presented herself for medical examination. In her history was the fact that in 1914 her left kidney had been removed by Doctor Brinkman of Philadelphia for cause unknown to the patient. There is a suspicion that the organ was tuberculous. She had an old duodenal ulcer under good control, some varicosities, and menopausal vasomotor manifestations. There had been two full-term pregnancies. There was a small subareolar mass in the right breast. The right kidney was palpable. A test for capillary fragility was positive, there being eleven petechiae on an area six cm. wide after application of the blood pressure cuff for five minutes at a level of 80 mm. of mercury. Leg varicosities were present in addition to a history of easy bruising. Her blood pressure was recorded in a range of 156/90 to 130/70, the higher level being noted at the original examination.

The routine of laboratory studies in this patient was as follows:

Sedimentation Rate	17 mm. in one hour
C.B.C.	
Hemoglobin	13.5 grams
R.B.C.	4,550,000
W.B.C.	10,200
Differential	
Polys seg.	71%
Polys unseg.	2%
Lymphs	27%

Mosenthal Test revealed a range of specific gravity of 1.005 to 1.020 with a normal diurnal-nocturnal excretion ratio. The microscopic examination was normal. The blood cholesterol was 230 mgms. per cent and esters,

47 per cent. The electrocardiogram showed a left axis deviation with inversion of the T wave in lead 3.

DISCUSSION

Three female patients who had undergone nephrectomy were seen in close sequence. All of these women had lived quite normal lives despite a constant sense of apprehension as to their renal status. In all three the remaining kidney was palpable. In all three the blood pressure was hyperreactive but only in the first patient could it be regarded as permanently hypertensive. This same individual has impaired renal concentration ability as inflected by the Mosenthal procedure. In all three the blood cholesterol figure (done by the same laboratory) was somewhat above normal but not grossly so. "Heymann and Clark induced lipidemia in animals by bilateral nephrectomy and ligation of the ureters. Lipidemia also develops after nephrotoxic nephritis and subtotal nephrectomy. The cause of this phenomenon is unknown . . . " (1) In all three the left kidney was involved in the pathological process and was the one removed.

CONCLUSION

Three women who had left nephrectomy respectively in 1916, 1906, and 1914 were studied generally. A fairly normal life has been enjoyed by all of them without particular incident relative to dependence on one of usually paired organs. In only one is there evidence of impaired renal function and this is fairly well compensated.

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REHABILITATION PROGRAM

Unless our ailing aged are trained to help themselves by 1980 there will be one individual "flat on his back" or physically helpless for every able-bodied worker.

The Rehabilitation Program at Bellevue has taught 90 per cent of the chronically ill and aged patients to walk again and care for themselves, and 40 per cent have been able to return to work.—Howard Rusk, M.D., chairman N. Y. University's Dept. of Rehabilitation and Physical Medicine.

Attitudes and Activities of the Middle-Aged and Aged

L. Pearl Gardner, PH.D.*

INTRODUCTION

EACH PERSON becomes first a participant observer and then an experienced actor in the inescapable process of becoming aged. Ageing brings problems that everyone must study and solve both as a group-member and as an individual. Certain considerations should be kept in mind, such as the variation in needs at the different stages in the process, the cultural determination of the status and role at these stages, and the increasing importance of the group to be served.

The aspects of ageing take on difference values from decade to decade. This is evident physically, and even more evident socially and psychologically. The needs and therapy for persons at 45 and 75 have many points of difference. Perhaps the first consideration would be the recognition of this fact by a more specific classification of the areas of investigation, for example the middle-aged of 40 to 59, the pre-aged of 60 to 79, and the aged of 80 and upwards. These periods may seem generous now but become increasingly more appropriate with the rising average age of population. The years give but a rough estimate of ageing; there is a need for more precise measures[49] assessing the ageing process in terms of physiological, social, and psychological functioning.

The problems of the middle-aged largely emphasize the escape from ageing by keeping youthful. Ponce de Leon left an unbelievable number of followers whose driving interest is an attempt to forestall the inevitable. Vigorous attention is given to first one then another physical strategy, supplemented by liberal camouflaging, and attended by a lurking fear of futility.

UNFORTUNATELY in the middle-aged period, the most useful ally for inner growth of philosophical perspective and personality integration, is usually resorted to only as an emergency measure during neurotic crises. In the battle to retain youth, each person should fight with valiant effort and good judgment, without the compulsion of apology; but one must always be prepared to be a good loser. Unfortunately many fail here and droop sourly in ineffectual striving to do the impossible. To prevent this, increased knowledge should be sought and the admission of a real problem, although it be but humorously recognized, should be made. Kaign's[24] suggestions on retirement are profitable. Burgess'[10] treatment of mannerisms will certainly cause one to

This data was collected when the author was on the staff of Cornell University, Ithaca, N. Y. and compiled on the staff of U. S. Public Health, Washington, D. C.

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get up, look in the mirror, and do something to be alive. Stolz's[55] clever suggestions concerning old maids, second marriages, and loss of children touch some unusual aspects of the problem. Good hygiene may be profitably learned in many books, such as Browning[9], Josselyn[22], Gumpert[18], Bogomolets[7], Bauer[3], Boas[5], Todd[58], and Newman[37]. A person who wants more serious and profound preparation for middle-aged problems would profit from Lawton[27], Thewlis[57], or Cowdry[13]. This program of keep-up, step-up, and pep-up is appropriate for the middle-aged but assumes less importance for the pre-aged.

THE PRE-AGED of 60 and 70 are willing to acknowledge some encroachments of ageing and adapt themselves accordingly. The pre-aged have progressively increasing importance in our society and should have a recognized, respected status and role. Society, according to Linton[30], depends upon patterns of reciprocal behavior between individuals and groups; the polar positions in these patterns are statuses. A status is a collection of rights and duties, and the status of the individual is the sum total of these various statuses in the social patterns, the dynamic aspect of which is the role. If each pre-aged person performs more duties and has more rights in our society, he gradually builds up the status and role of his group. The ideal patterns for our social life with increased respect and authority for the pre-aged take form from the individual aspects of the status and role of each aged person.

Simmons[50] has evaluated the status and role of the aged in many primitive cultures. Under difficult physical environments, the assurance of food for the aged was more likely found where communal stores existed, for example among collectors and fishers. Old men were overwhelmingly more favored than old women in important and civil offices in most societies; however, the latter performed functions in initiatory rites. With advancing social complexity, organization, and economy, the aged have had steadily rising status. Key positions in a wide range of social activities went to the aged, for "... in primitive societies aged men and women have been generally regarded as repositories of knowledge and imparters of valuable information, as specialists in dealing with the uncertain aleatory element, and as mediators between their fellows and the fearful supernatural powers."[175]

THE DEPRECIATION of a future life[32] has torn away the very foundation for attitudes of respect and appreciation of the aged. The decline of the authority of the father[16] and the exaggerated values of youth all tend to militate against the status of the pre-aged. Among the Greeks[47] old age was thought a punishment, but the characteristics given the aged were prudence, discretion, and mature judgment. Among the Chinese both religion and authority combine to give status to old age and make for happiness and security. These illustrations all point to the possibilities of cultural modification of pre-aged status.

Progress toward cultural modification of an aged status and role involving respect, prestige, authority, security, and happiness can be gradually made

and at the same time retain adequate values for youth. There is a fundamental contradiction between the ever increasing average age of the population and America, the Young Nation. The ideal citizen will probably be improved with a few gray hairs, a few lines in the face, and increased judgment; but he has to be popularized in the public eye. Perhaps a re-evaluation of philosophy, religion, and authority might have a useful place in the life of this mature citizen. Much of the world's work and thinking have been done and will increasingly be done by this group. If half our population should be over 45 years of age and 15 per cent over 65 in 1980[49], and if normal longevity should even approach 125 years[7], surely the American halo of youth and action should be replaced by maturity and thoughtfulness. Even today our average population seems to be reasonably "dry behind the ears."

THESE PRE-AGED are not only numerous but are doing worthwhile things for our nation. In 1930[29], there were two million over 65 gainfully employed, that is, five per cent of the working population. In 1940 there were about a million wage and salary workers[41] over 65 or about three per cent of the total. The great contributions of the pre-aged in key social positions, these polar points where experience and poise are so needed, should be given more attention. Achievements of the aged[56,1,2,19,34], autobiographies[59,26,36,52], and various old age movements[40], for example clinics[33], School of Maturates[31], and many others, are all efforts to develop and enrich the status of the aged. In the last analysis, "Whether young or old, one earns one's place in the sun and retains it only by increasing effort"[42,174]; therefore the individual performance of each pre-aged person contributes to the collective pre-aged status.

The aged of 80 and upwards are the pioneers who must build the good land of the aged; they are the heroic defenders of whatever personality and spirit may be retained in the losing physical battle. It is just this inevitable aspect, so often ignored, denied and covered up, that produces the feeling of futility in the aged.

"Writing of old age is much like describing an illness; a chronic illness never to be cured but which must be endured stoically and cheerfully, with courage and fortitude, and more important still—with humor and curiosity . . . and I wonder what loveliness I am letting slip away in these last 'here and now' years."[26,181,184]

THE SPIRIT of this quotation can hardly be matched by youthful exploits in the flush of physical vigor.

Although there may be some spread from the respected status of the pre-aged to the aged, the aged in their own right have a mission to perform for all the masses of people who must follow them through the land of old age to discover the "loveliness . . . in these last 'here and now' years." Their service is to perform nobly and valiantly when least able to do so without expectation of praise in a futile contest; their gift to mankind, to all those travelers who have no choice but to follow their footsteps, is to find possibilities of enriched personality to replace the futility, and to destroy the fear

of death. Whatever weapons they find useful in this great losing battle, in the form of systems of biological thought, philosophical insights, religious comforts, and scientific data, shall merit the grateful respect and careful consideration of each subsequent traveller.

PROBLEM

AS STIEGLITZ[54] points out, "The shift in age distribution may be made the basis for splendid cultural advance if the increased longevity is paralleled by health and productiveness."[906] To gain these goals, information from the aged themselves relative to their attitudes, wants, and feelings becomes pertinent; therefore, a study of the attitudes and activities of the aged in their interpersonal relationships was undertaken. This study gives needed information upon the adjustment of aged people in the homes of the middle classes.

Among the few studies of this type, is an early one by Hall[19] in which he sent questionnaires to noted old people. He found a resistance to confessionals of any type and a benign tendency to forget the unfortunate. Their greatest recreation was in reading with frequent turning to nature and solitude. The increase in isolative response was both due to infirmities and increased individuation. There was aversion to drugs and scant reliance upon doctors; however, each had his own beneficial therapy. Most of them did not wish to live their lives over, implying dissatisfaction with any future existence that repeated this life even with improvements. Generally, "the old are very prone to develop if they have not had it before, a kind of educational instinct in the larger sense of this word; they wish to admonish or exhort, if not the world at least some section of it, to better and wiser living."[334]

TECHNIQUE OF RESEARCH

TO DISCOVER this attitudes and activities of the aged, college students with some training in psychology, usually six semester hours, interviewed old people in their community with a detailed questionnaire. Inasmuch as the subjects were usually acquainted with the family, some check upon the accuracy of the data was made by each interviewer. Subjects 70 years or more were used wherever possible; this decreased the cases in the 60's somewhat. Interviews were made without other members of the family present. Subjects failed to give some items of data for various reasons; the average omissions were 5 to 6 per cent; hence any significant increase usually indicated resistance to that item. On the whole men were somewhat more frank than women, and hence probably indicate trends somewhat better.

SUBJECTS

A group of 193 subjects were interviewed of which two-thirds were women. The age distribution was as follows: 28 per cent in the 60's, 50 per cent in the 70's, 20 per cent in the 80's, and 2 per cent 90 and above. The median age for the group was 74 years. Two-thirds of the 5 per cent unmarried, were women, with cases distributed evenly in the decades. There

were 55 per cent who lived with a married son or daughter; 19 per cent who lived with spouses; 12 per cent lived with other relatives; and 14 per cent lived alone. There were 41 per cent economically independent, 23 per cent partially dependent, 16 per cent completely dependent, with 20 per cent (27 per cent men, 17 per cent women) omissions. Probably about one-third of the group were dependent; men were more sensitive than women about the situation. For the 60's 29 per cent were independent, for the 70's 38 per cent, and for the 80's 64 per cent. Dependency was often rationalized with such comments as these: "It's due me now. . . . As it should be. . . . They should support me." More frequent were the expressions of satisfaction at independence: "I carry most of my own weight. . . . They live in my house. . . . I earn my own way. . . . Feels darn good."

COMPARISON with the 1935 individualized requests to the Bureau for the Aged of the Welfare Council of New York shows the same proportion of sexes. The age distribution for the Brunot[9] study was: Thirty-six per cent in the 60's, 41 per cent in the 70's, 21 per cent in the 80's and 2 per cent in the 90's and over. The difference in the first two decades was probably due to the selection of cases in this study. Of those reporting, 38 per cent lived with relatives, 11 per cent with a spouse, 29 per cent alone, 12 per cent in institutions and others variously. There were 38 per cent self-sustaining, 4 per cent partially dependent, and 58 per cent wholly dependent (only one-third upon the family). The most striking differences were in the number partially independent and the closeness of family ties; probably a difference due to the cultural level of the subjects.

CONSIDERATION OF DATA AND RESULTS

1. *General Appearance*

The aged find it difficult to maintain appearances due to several factors. Stiffness of joints and pain inhibit such interests and economy prevents their spending money. They also have a feeling that they will never look the way they used to anyway. Moreover as Vorse[59] points out, they have "a whole set of rules and regulations to live by, and regulations that are not self-imposed, but imposed by custom and enforced by the younger generation"[60] without regard for long habituated preferences for a style or garment.

THE INTERVIEWERS in this study included a short description of the old people, a majority of whom were neatly dressed with care and style. The liveliness of the subjects (perhaps somewhat compensatory) was often mentioned. The subjects thought the family often noticed how they looked in 41 per cent of cases, occasionally in 37 per cent, and rarely in 18 per cent (P under .01). This data indicates either unwillingness to admit or possibly a hope that the family did not notice their appearance; in fact, only 21 per cent stated they thought the family should show more interest in their looks. Criticisms of their own personal appearance and admitted criticism of the family in this regard were in a proportion of 5 to 2; women gave twice as

many details as men for both. Both men and women were most troubled by their thin gray hair or by sallow wrinkled skin while criticism of the family largely centered about items of clothing or neatness of appearance. Men were criticized twice as often as women for untidy appearance and attachment to a particular old hat or sweater. This might mean that women were unwilling to admit this or that they made more effort to conform.

THE WOMEN felt they should not wear light colors in 29 per cent and bright colors in 50 per cent of cases while men omitted the question. A few rare grandparents were criticized for gaudy colors in dress or neckties. Although the women actually wore all colors, blue and black were preferred. In the case of the women 55 per cent used powder, 25 per cent rouge, and 10 per cent lipstick. This is very progressive for a mean age of 74. Both men and women were about equally divided on the issue of the use of these complexion aids in later years.

2. Condition of Health

Interest in personal health may become a source of much preoccupation in old age with considerable security to be derived from specific formula, relative to diet[31], exercise[4], or other hygiene habit. Worcester[61] gives very simply the cardinal requirements of senescence as more warmth, more rest, less work, and less food. As Stieglitz[53] notes, the aged usually suffer from several, not just one illness; and the incipiency of these, when therapy would be most effective, is usually not noticed. Boas[6] reports 58 per cent over 65 years with chronic disease or gross physical impairment. In 1934, a study of 1,000 recipients of old age assistance over 70 years showed 65 per cent in need of medical or nursing care. The New York group[9] showed 60 per cent physically ill, disabled, and mentally ill, 10 per cent bedridden or badly disabled and 20 per cent homebound.

Unfortunately normal pictures of the health of the aged are lacking. Howell[21] claims his 340 Chelsea pensioners to be normal. Among these, 21 per cent showed no abnormal physical signs and 4 per cent looked younger than their years. In this group 79 per cent had an elevated blood pressure while arterial thickening was common and increased with the age of the patient. Although hypertension was relatively frequent, cardiac enlargement appeared in only 7 per cent of the cases and heart murmur in 8 per cent. Only 5 per cent had neurological lesions although deep reflexes were commonly absent. Hernias often developed later in life. Some degree of fibrositis was frequent. The most striking fact was that 37 per cent had enlarged livers.

ONLY 18 PER CENT (24 per cent men, 15 per cent women) of cases in this study thought they were in poor health with the others equally divided between good and fair health (P under .01). There seemed to be little difference in the age groups although the 80's with women predominating, reported only 5 per cent poor health. Men (50 per cent good) however, estimated their health appreciably better than women (50 per cent fair). Only 4 were

confined in bed while 11 were somewhat limited in walking. In the case of one 91-year-old man who took his walk each night without exception, the interviewer had to "run to keep up."

MEDICINE was taken by 2 men and 3 women in 5 with the group as a whole equally divided on this issue. The 80's took medicine in only 2 of 5 cases. The average number of medicines taken was 2.6 with no age or sex differences noted. Although half the group asserted they did not talk about their medicines, 12 per cent admitted they did and 34 per cent omitted the item. Only 25 per cent felt the family should show more interest in the medicine taken but 27 per cent omitted the item. Since only 5 per cent usually omitted data, it would seem probable that nearly half the group did talk about their medicines and as many wished the family showed more interest. Another measure of health would be found in the amount of talking about "aches and pains"; 16 per cent talked much, 25 per cent some, 50 per cent little (P under .01). A few, mainly women, added that they "never" talked about this, a reflection either of effort in silence or of family training in this particular. About one-third of the group thought the family should show more interest. The fact that half of the group throught the family should be interested in their medicines and only one-third in accounts of illness is probably a good illustration of the protective attitude of these old people that few hints of censure be brought against their families.

About 2 in 5 felt the cold (3 in 4 in the 80's) more than the family. The sexes showed differences in adjustment to this situation. Only 3 per cent continued cold (more often women), 31 per cent insisted on more heat (more often men) and 51 per cent put on more clothes (more often women). Irritability might be expected to be measured by the amount they were bothered by noises (P over .02); however a few women asserted noises bothered them none at all.

INDIRECTLY the physical condition of health was somewhat supported by the motor flexibility of these old people and their independence. There were 83 per cent who did not want to be helped to a chair; 62 per cent agreed such help made them feel older. While 80 per cent went for their own drinks, 18 per cent asked someone to get them a drink. Half the group thought they acted young in their posture and walk, but only 2 in 5 for the 80's thought so. As Vorse[59] points out, the aged need the seats on the street car, but they would like to receive them unostentatiously.

3. *Personality and Disposition*

Several writers discuss the personality of old age[20,44,12]; the latter gives the traits of old age as suspicious, prejudiced, afraid, untidy, fussy, cantankerous, impatient, giving up, and giving in. Klopfer's[25] analysis of 50 cases on the Rorschach showed the aged person to be slower, less productive and efficient due to emotional disturbances of ageing and the accumulation of problems present during the person's lifetime. They were constricted in inner

integration and adaptive social responses with some resemblance to patterns of early life. Prados[43] similarly analyzed 35 cases of old people with the conclusion that their affective life became quite shallow with little inner conflict and with slight emotional rapport. With increasing age, instinctual demands appear as in childhood. Several have written personally of the changes occurring during ageing.[52,36,59,27,1] A 75-year-old woman[27] summarizes aged personality thus:

"We are inclined to be garrulous, and as impatient, combative, sensitive, and irritable as spoiled children. If our inhibitions have not been built up by wise parents and painful experiences, we are not pleasant to live with. We look backward too much, forward to the immediate future too little, talk too much; listen, read and think too little, and most of us pray only during an emergency." [180-181]

THE EXPERIMENTAL group in this study estimated themselves high in happiness with 38 per cent very happy, 48 per cent somewhat happy, and only 9 per cent a little unhappy and 3 per cent very unhappy (P under .01). There were no sex differences but 4 of the 5 unhappy ones were under 80 years. Analysis of the questionnaire of the 73 "very happy" cases showed other data contradicting this in only 6 cases. These happy ones were 75 per cent wholly and 13 per cent partly self-supporting in comparison to 41 per cent for the entire group. Only 10 per cent did not like jokes while 65 per cent thought they were jovial and laughed much. Either old age is happier than one would expect or again this is courageous wishful thinking.

With the passing of years 65 per cent thought their dispositions had remained the same, 20 per cent had grown worse, 10 per cent (6 per cent men, 12 per cent women) had improved (P under .01). Only 66 per cent of the women and 79 per cent of the men were willing to state their worst faults. A summary of the answers showed irritability (impatience, cranky, grumpy, fussy, complaining) made up 40 per cent, quick-tempered (perhaps an intensification of the former) 23 per cent, and stubbornness about 10 per cent. Failure in memory or confusion was rarely mentioned although the mental capacities of the aged are frequently discussed.[17,26,35]

4. *Social Relationships*

Undoubtedly for the aged, the feeling of being needed and really wanted by the family is the most powerful stimulus to happy living, and even perhaps, to life itself. Lee[28] believes that elderly women live longer because they make an easier transfer to old age due to a feeling of greater usefulness in the home. The single woman of the lower economic group is three times as likely to become dependent as the married one, partly because of the unreasonable demands of her relatives.[46] Hundreds of letters in answer to the Chicago Daily News question, "Where do you think elderly people should live to be happiest?" probably express both the attitudes of the family and the aged,—"Alone." Many housing plans[48] now provide small home units for individuals. Half of the requests for boarding homes in one

sampling[9] came from the old persons themselves. As Simmons[50] summarizes: "Indeed, in broad cultural perspective, it would seem that few social expedients have been left untried by the aged in their search for security within the confines of the family; and it is just here, in the home and the circle of kinship, that the old have always found their greatest security during the closing years of life."[216] Family attitudes create for the aged a happy security to be cherished or a misery to be escaped. Social isolation[38, 42] has been aptly summarized by the latter: "no loneliness can be harder to endure than having nothing in particular to do, and no one to do it with."[35] Agedness itself may well limit the amount of social participation as Barr[2] suggests, "after a week of public meetings, I found myself tired and not able to sleep."

THE SOCIAL interests of the aged were measured in several ways. There were 17 per cent (23 per cent men, 15 per cent women) who wished to stay by themselves rather than with the family. Only 7 per cent felt "unwanted or in the way" of family activities often, 33 per cent sometimes, and 44 per cent rarely (P under .01) while 11 per cent (all women) added the word "never." Each of these groups seemed to add comments about equally often. Comments were made by 68 per cent men and 56 per cent women; this shows the frequently noted tendency for the old men to be more outspoken. About two-thirds of these comments were negative and gave sources of dissatisfaction; for example, "They never listen to what I have to say," and "The family seems to have a lot of outside interests and make me feel in the way."

For those who had positive comments, which largely avoided the issue, the following quotations are illustrative: "I keep busy with my own activities." "The kids like me to be with them and there are lots of things I can do." "I enjoy entering into the affairs of the family." "I have so many activities of my own I'm not around to be in the way." "My garden and I get along good together." "They ask me to stay with them and seem to like to have me."

These comments suggest that more than half of these old people felt in the way and somewhat unwanted, probably a reflection of family feelings. If they maintained active interests of their own, they were either better adjusted people or perhaps had less time to meditate upon grievances. The 70's were sensitive to this question, adding most of the "never's." This supports the idea they were less happy; probably this decade represents the transfer from their own homes to their children's.

SEVERAL other questions indicated social interests. Only 1 in 5 wished to be included more often in family conversations. While 79 per cent (more often women) took much interest in family affairs; 70 per cent thought the family liked to have them take such interest. About 17 per cent desired to have friends under 30 while the others preferred older friends and 67 per cent had friends of their own ages. These facts indicated that 4 in 5 talked about

as much as they wished and took a part in family affairs but that 1 in 3 doubted the family's appreciation.

THE STRUGGLE for dominance of the two generations appeared in the expectation of the aged of some filial submission. One-third of the cases (more often fathers) expected their grown, usually married, children to obey them, about half expected them to ask advice, and three-quarters expected them to respect their wishes. Even the grandchildren were expected to obey in 36 per cent of the cases, to ask advice in 38 per cent and to respect their wishes in 65 per cent. While 64 per cent thought they should not interfere in the training of the grandchildren, between 18 to 30 per cent (including omissions above 6 per cent) thought they should.

What the family was most impatient over in the behavior of these older ones, was answered by 85 per cent men and 66 per cent women. Of the 159 items mentioned, the frequency of complaint was as follows:

Do too much, not take care of self	16%
Talking too much (old times, etc.)	16
Personal habits (eating, teeth, etc.)	15
Interference with family (children)	14
Irritability, impatience	12
Mental reaction (slow, confused)	9
Obstinate, set in ways	7
Miscellaneous	11
	100%

Although some of these complaints might be due to the slow coordinations typical of old age, many of them suggest that the older ones took up social space that the next generation wished to possess.

WAYS OF helping the family were given by 91 per cent, a tribute to their desire to be helpful. What the aged person did, seemed to be determined by the living situation, more than the capacity to work, particularly through the 70's. If these old people lived alone or with a relative who really needed their services, they seemed to do most of the work of the household. If they lived with a married son or daughter, they did all kinds of chores, particularly caring for the children. Possibly the married sons and daughters gave the grandparents the tasks they disliked even as those same parents had been given all the dishes[16] to wash by the grandparents many years earlier. Through the 80's and 90's the aged did lighter chores in the family with the last emphasis upon caring for their room and their personal needs. As a matter of fact 18 per cent of those in the 80's lived alone and apparently looked after themselves satisfactorily.

It is significant that the family wished them to help more in only 9 per cent of cases, less in 47 per cent, same in 21 per cent, with 23 per cent omissions. This suggests that the assistance of hardly 1 in 3 was really wanted in the homes. For the family to have expressed more appreciation would have been helpful in 46 per cent of the cases. Obviously the services

were neither needed nor particularly wanted in most of the cases. There seems to be some inconsistency between 70 per cent who felt the family liked their interest in affairs and 9 per cent who wished them to help more.

The family thought them old-fashioned in 42 per cent of the cases (greater for men). Actually 58 per cent gave some way in which the family thought them old-fashioned. About 1 in 5 were considered old-fashioned in their habits or clothing while the others were old-fashioned in their ideas, centered largely about the evils of the modern age or the younger generation.

SUBJECTS checked only 2 to 3 activities from a list of 6 with the popularity indicated below:

Visiting 24%	Radio 19%	Riding 11%
Reading 21%	Working 16%	Walking 8%

Of the two activities not a part of their youth, radio was preferred to riding. The unpopularity of walking is lamentable.

5. *Meditation and Death*

Aged people spend many happy hours in daydreams of the past as the following quotation from Barr[2] shows:

"The past is as much me as the present. I go constantly back to it for instruction and comfort[39] . . . Then all the past years seem to rise above and beyond me, the charm of something more than earthly is theirs, did I have for them that dreamy affection we are apt to give to whatever will never come back again[40] . . . And I sat still dreaming of the land where my home and my dear ones dwell . . . And a great longing to depart and be with them filled my heart[68] . . . "

Questions relative to frequency of daydreaming showed that only 7 per cent denied the activity. Omissions were most frequent for the future 19 per cent as compared to 3 per cent for the past and 14 per cent for the present.

THE DATA suggests that meditation upon death was more common than admitted. The 60's mentioned it 22 per cent of times, the 70's 15 per cent, and the 80's 10 per cent. The usually more frank men mentioned it 23 per cent and women 9 per cent. Much of such anxiety relative to the future was probably projected upon war conditions, health, and the younger generation. Hall[19] stated: "the old generally refuse to face squarely and come to terms with the death-thought consciously because it is more fatal to them than to the young, but fly to every kind of relief from it by diversion to other things and themes." 356-7

When such questions as these appeared, tension and fear also existed:

How long will I live?
I dread death.
How soon will I die?
What is death like?
What takes place before and after death?

Since the aged are free of responsibilities and routine cares, one might expect the aged to sleep well. The opposite, however, is true, for as Barr[2] states: "I wondered why age was generally all over the world a time of little sleep and of long night watches . . ." Worcester[61] states: "Curiously enough the cling to life generally increases with age." The Rorschach data, formerly cited, indicates that the emotional life becomes shallow, less capable of rapport, more instinctual and unadapted as in childhood. Children are often unaware of the sources of their tensions and fears, which however appear to disturb sleep. Would it not be quite possible that this fear of death pushed out of the consciousness of the aged, as the data of this study might indicate, appears in such a way as to interfere with natural relaxed sleep, particularly at night, while these same aged sleep well in the daytime when people are around to protect them against this nameless dread?

ARIETI[1] offers the following observations relative to this problem with a somewhat different explanation:

"Future anticipation as related to the self is decreased in normal senescence. The ageing individual becomes less and less concerned about the future, and when senescence arrives, his interests are practically confined to the present time . . . In other words, we have in old age what I call 'a restriction of the psychotemporal field'. At times, old people have so little interest in the future and their capacity to worry is decreased to such a point that they become slightly euphoric. For instance, fear of approaching death is felt much less intensely by old people than by young adults. Although this may be explained as a philosophic acceptance of the ineluctable laws of nature, I am more inclined to believe that this is due to minor organic changes affecting predominantly the frontal lobes. As a matter of fact, these characteristics are exaggerated in senile psychosis, and cerebral arteriosclerosis. . . . In the senescent instead, and to a much more marked degree in the senile, we have a real organically determined psychotemporal restriction."

Since death is an event in each life and since it will be usually met when one is least able to cope with it, both essential information and the emotional aspects of the problem are worthy of consideration. As Simmons[50] states: "For an old man or woman to die in some societies has been like making a great adventure in state: but in other groups the march toward death has been a pathetic and ignominious struggle every inch of the way. In death as in life, man's fate has been decided by the mores of his time and place."[244]

SINCE THE people make the mores, the problem needs study and only a few have given these aspects much thought.[60, 56, 19, 11] Jost[23] discusses whether the chronically ill, aged, or incurable might not be given the right to death.

Worcester cites William Hunter, the anatomist, who was conscious to

[1]Silvano Arieti, The processes of expectation and anticipation. J. of Ner. and Men. Disease, 1947, 106, 471-481.

the last and said, "If I had strength enough to hold a pen, I would write how easy and pleasant a thing it is to die."[43]

Science has undermined the philosophical and religious props of the aged without giving any intelligent and emotionally satisfactory substitute. The natural event at life's extremity needs to be pulled out into the open, discussed, and clarified. In death as in life, there is great need for tolerance of individual needs for the amount and form of security that a given person finds essential for his own peace of mind.

Some individuals need a more personalized prop than others in death even as in living; possibly physical weakness of the aged condition itself, needs this more personalized security for complete peace of mind. The security of the individual and his peace of mind in this extremity are more important than quibbling over validities of systems of thought.

THEORETICAL CONSIDERATIONS

This group has a mean age of 74 years and represents a higher cultural level than most other studies of the aged since two-thirds of the cases are partly or wholly economically independent and live with relatives by blood or marriage in 4 out of 5 cases. In many studies hardly two-fifths are economically independent and about half live with relatives. This study may represent old age at its best under home conditions. These factors must be considered in viewing the data.

The health conditions were good since only one-fifth complain of poor health while many other studies of less mean age report nearly two-thirds ill. This is of course the opinion of the aged themselves; there might be involved some wishful elements or overestimations. In line with this assumption would be their statement that half did talk about their aches and pains and medicines and that they took two or three kinds of medicine.

On the other hand there is much supporting evidence of the estimate of good health. Rather rarely did the cases mention specific illnesses or complain about them to the interviewers. They cared about their appearance sufficiently to impress observers. The women approved and used rouge in one-quarter of the cases. Only 1 in 5 report family criticisms relative to appearance. Only 2 per cent were bedridden compared to five times that amount in some other studies. They were most willing to work, and only one-tenth were unable to do so. Only one-fifth wanted to be waited upon for a drink. Only one-tenth reported themselves quite unhappy. They had strong social interests in the family in three-fourths of the cases with dominance patterns in a third to half. Most of the family criticisms were for over-activity and helpfulness. Furthermore the 80's rated less poor health than the group and less medicines taken. More of them lived alone, were more happy and more economically independent but less agile. Since they honestly report less agility, the other items were probably truthful. At the age of

74 years, the laws of natural selection have also eliminated a great many of the less fit individuals. In general the group had broad background conditions facilitating health in the security they enjoyed by virtue of their economic conditions and home life with relatives. The group seems to be on the whole rather healthy in comparison with other studies, and the data supports this assumption.

SEX DIFFERENCES were for the most part not impressive although the males must have been more rigorously selected than the females who outnumbered them two to one. The men estimated themselves more at the extremes of good or poor health while women tended to rate themselves as fair to good. Sexes rated themselves similarly in happiness, independence and tendency to daydream.

Some minor trends and differences were noticed between sexes. While there were double the number of women in the study, proportionately, twice as many men lived with spouses and four times as many women alone. Men were more sensitive over economic dependence than women. Men were somewhat less interested in personal appearance and gave half as many details; they were criticized doubly as often for untidy appearance. Old men were more often considered old-fashioned in habits and ideas. Women were more tactful and sensitive to the needs of conforming to modern trends. For example, when they felt cold, men asked for more heat while women put on clothing or continued cold. Men expected more obedience. While both sexes gave the same faults for their disposition, women more often felt they had improved with ageing and gave less faults. Only women added "never" to questions about being wanted in the home. Men confessed to staying somewhat more to themselves and women seemed to take more interest in family affairs. While the reported family criticisms were similar for both sexes, women reported themselves more fussy over details, more bossy and more moody than men. Men more often stated they daydreamed over death. On the whole men were more outspoken and unconforming as well as less interested in appearance and domestic affairs.

THE PERSONALITY of the aged may be merely an intensification of former traits or may have some change due to the process of ageing itself, or to some concomitant conditions. Rorschach results of the aged indicate constrictive and inadaptive trends with lower and slower mental productivity. Some of these early studies were done upon institutional cases and may not be representative for this group. Subjectively two-thirds of them felt about the same in disposition while only one-fifth felt they had grown worse.

Several items in this study indicate the aged to be more adjustable than popularly supposed. Since these women were girls in 1890, it is remarkable that so many used cosmetics and wore bright or light colors. Family criticisms report only one-fifth to be old-fashioned in habits and clothing although the others were old-fashioned in ideas. Although they had once been figures

of authority in the home, two-thirds of them did not expect to be obeyed. These old people omitted items rather than register protest against their position in the homes. Perhaps the fact that only half talked of aches, pains and pills and that most of them were anxious to work and wait upon themselves, indicates considerable adaptation to the discomforts of ageing.

THE DISCREPANCY between what these old people themselves considered as their faults and what they reported the family considered as faults, is most striking. While two-thirds of them felt irritated and quick-tempered, the family considered this a fault in hardly one-eighth of the cases. Two-thirds of the family fault finding centered mainly about the aged talking too much, doing or interfering in family affairs and slightly about their poor personal habits. Actually most of these old people felt somewhat unwanted and in the way in the homes with their offspring, and perhaps the irritation and quick temper expresses their frustration. Similarly the frequent day-dreaming may represent an escape from the unpleasant elements of the present.

The data in the spontaneous comments suggest an underlying conflict in the home relationships of these aged people, for two-thirds of them felt in the way and not particularly useful while the other third appeared positive by evading the social issue through individual activities apart from family life. The complaints centered about the fact that these old people were no longer considered important in the family affairs and resented being in the background. Their assistance was not wanted in one-third the cases and yet many were quite capable of doing many helpful chores. More than half the complaints of the family centered about too much participation in the family life. The data suggests that these healthy, active old people persisted in some forms of dominant activities which were resented more or less tactfully by the family.

THESE OLD people had many factors that supported their role of dominance in the home. They had the backing of economic independence either wholly or partly, in two-thirds of the cases. They were quite healthy and active for their years, alertly interested in activities of the household, and wanting to work according to their capacity. They were used to long years of practice in authority patterns. They still expected obedience in a third of the cases from their offspring and even from the grandchildren. They practiced such patterns in the care of grandchildren. Most of them at least expected their wishes and desires to be considered. Since the aged remained in the homes so much, the lack of dominance may have been felt more by the women. Any sugar-coating of "You should not work so hard" was recognized underneath for a dominance pattern more often than a consideration one. Perhaps some of these same parents remembered the punishments they gave with the remark, "This hurts me worse than you." Probably many of these dominant women were quite ambivalent during the childhood of these grown offspring who subconsciously respond with similar ambivalence. However, the loss of

physical powers day by day, necessarily weakens the claim of the aged to dominance in the home.

The aged are faced with several frustrating conflicts. If they live alone or with strangers, they may dominate the situation to some extent, but they are lonely and progressively less able to maintain themselves. If they live with their offspring, they must give up their loved things and accustomed ways of living or else be disapproved by the family. They are bound to be somewhat unhappy either way, but this study indicates they made tremendous efforts to conform to the wishes of the new generation. The aged are rather careful about criticizing their offspring for any form of neglect; however, this may be projected upon the general evils of the modern generation of youth. While children become a potential asset in the home, the aged become a progressive liability in terms of care and attention.

Various adaptations to the problem may be made. The aged might well have a more insular position in the homes of their offspring where they may reign somewhat supreme over their own little home of the past. Houses have to be adapted to infants; they need to be adapted to the comforts of the aged. A long view upon the problem of the aged must be taken in terms of reciprocal service between generations so that respectful consideration and some courteous submission become accustomed tribute to the aged of any generation.

In addition, there is a useful place for therapy for the aged, largely centered about the interpersonal relationships involved. Just as in the early stages of the parent-child relationship, the parental attitude of love and acceptance is so important to the child, so in the later stages of this relationship, the filial attitude has similar value. The old person needs real work in the home, to feel a part of things. Neither the child nor the aged perform so efficiently as at other stages, but the aged are less easily deceived by "busywork." Even as the child needs patience with its ignorance of the customs and values of its parents, so there is need for filial consideration of and respect for the habits and values of the previous generation, now so strong a part of the life of the aged. Consideration of the activities and recreations both wholesome and individually satisfying for the aged, should be a part of this therapeutic program. For the mature to learn patience both with children's questioning of the future and aged reminiscences of the past is probably more profitable than expected when the right attitude is involved. A sensible but not all absorbing health program would be useful. There should be opportunity for the aged to discuss and work through the emotional reactions to death. The aged have lived a long time, and usually wisely; much may be learned from them.

SUMMARY

1. Questionnaires concerning the activities and attitudes were presented to 193 older people between 60-102 years with a mean age of 73.9 ± 7.2 sigma by the interview method. The group was 64% partially or wholly

independent economically with close family ties since 80% lived with relatives.

2. Health was reported to be good with only 1 in 5 in poor health with an average of 2.6 kinds of medicine taken by the group. However, half of them talked somewhat about their medicines, aches and pains.

3. Happiness was reported by all but one-tenth of the group with a strong positive relationship to economic independence. Most of them felt their disposition had remained the same; however, more than two-thirds of the group felt their worst fault to be irritability and quick temper.

4. Strong social interests were shown by all but 20%. Two-thirds or more spontaneously remarked that they felt unwanted and in the way. Two-thirds of the reported family criticisms centered mostly about the interference of these old people in family affairs and somewhat about their personal habits. Most popular activities were visiting, reading and listening to the radio. Most of them indulged in daydreaming of the past.

5. The aged may enjoy fairly good health and happiness with some provisions for their welfare, particularly through attitudes of consideration, respect, and understanding.

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CORRECTION

THE November-December issue printed an article on page 353 by Joseph DeCourcy entitled Practical Nutrition of the Geriatric Patient, 24 Surgical and 14 Non-Surgical Cases. Inadvertently the title was deleted and the article ran under the subtitle.

The editors regret that the proper title did not appear with this valuable study.

GERIATRICS

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Geriatrics in Spain

AT THE personal request of Dr. Korenchewsky, made to the Spanish Doctors F. Grande Cobian and F. Vega Diaz, the Spanish Gerontology Society has been constituted in this country.

There had been a Chair of Geriatry in Spain since 1946, its holder being Dr. M. Beltran Baguena, Professor of Medical Pathology in Valencia University. This Chair was founded by the Higher Council for Scientific Research. It was included in the Doctorate studies and was, I believe, the first one ever founded in the world for such teaching. It received its first official grant in 1947 when it was included in a Geriatric-Studies Center placed under the management of the above said Chair and, naturally, of Dr. Beltran Baguena. One result of the latter's work has been the publication of some Lessons in Geriatry (*Lecciones de Geriatria*), the third volume of which has just appeared, reproducing the text of lectures given by Professor Beltran Baguena, who has been interested in geriatric problems ever since 1936. At the present time, the teaching of geriatry is carried on in Valencia University where Professor Beltran Baguena is doing important work together with a group of collaborators.

At a first meeting held in Madrid and attended by persons directly interested in geriatric problems, Dr. Marañon, specially invited by Dr. Korenchewsky to preside over the foundation of the Spanish Society, proposed that this should be organized under the Presidency of the man who had so far been, and still is, the only Professor of Geriatry in Spain, the aforesaid Dr. Beltran Baguena, and it was unanimously agreed by all present to appoint a provisional committee with Dr. F. Grande Cobian and Dr. F. Vega Diaz

as Vice-President and Secretary, respectively.

At another meeting held in Madrid on May 17 last, the Society was finally constituted, a Committee was appointed definitely, and the Rules previously studied were passed. Furthermore, the three subjects were chosen for the official discourses to be delivered at the first national assembly of the Spanish Gerontology Society, to be held in Madrid next winter. These are "Senile changes in the spine" (Dr. Pañella Casas), "Senile tuberculosis" (Dr. Navarro Gutierrez), "Carbohydrate metabolism in old age" (Dr. Grande Cobian).

It was agreed that the general work of the Society should proceed along these three main lines: senile clinical pathology, biological investigation, and demographic studies and studies on the means of protecting the aged, suggested by Professor Beltran Baguena.

Following in the footsteps of Dr. Beltran Baguena, evident progress has been made in geriatry in recent years. The first hospital Geriatry Department was opened in the Municipal Hospital of *Nuestra Señora de la Esperanza*, Barcelona, under Dr. Pañella Casas. This is a good institution with excellent buildings and equipment and highly competent personnel including the aforesaid Head of the Geriatry Department, the Director of the Hospital, Dr. Vanrell, and the cardiologist Dr. Martinez Gonzalez. In connection with it, the first extra-University course on Geriatry was held in April and May last (so far geriatric studies had been conducted exclusively in University lecture halls). In this course, directed by Dr. Pañella Casas, the following lectures were given with most successful results: Dr. M. Beltran Baguena on "Vascular arteriorsclerosis and physiopathology of vascular arteriosclerous degeneration"; Dr. Vanrell Cruells (Director of the Hospital and Head of the Geriatric Gynecology Department): "Gynecological affections of senility"; Dr. Mas Oliver (Head of the Hospital's Surgical Department): "The surgery of the aged"; Dr. Martinez Gonzalez, Head of the Hospital Cardiology Department: "Disturbances of the cardiac rhythm in senility"; Drs. Pañella Casas, Bacardi Nogueras, and Monteys Porta, Head and Collaborators of the Geriatry Department: "The problems of geriatry"; Dr. Lucena Raurich, Dean of the Barcelona Municipal Medical Department and Head of the Hospital Urology Department: "Disorders of miction in old age"; Dr. F. Vega Diaz, Head of the Geriatry Department of the Madrid General Hospital: "The functional capacity of the aged from the cardiovascular standpoint. Its practical determination and importance." According to reports, the text of these lectures is to be collected and published in one volume.

Later, Professor G. Marañon has founded a Geriatry Department in his Institute of Medical Pathology at the Madrid General Hospital and entrusted same to Dr. F. Vega Diaz. In it, research work is to be done especially from the cardiological standpoint.

This Department will be opened next October with a "Geriatry Week" in which lectures will be given by distinguished Spanish doctors and maybe by some foreign ones, too.

During the rest of the University year, lectures will be given on geriatric themes as well as some lessons in endocrine geriatry in the usual course in Endocrinology in Professor Marañon's Chair.

The geriatric studies carried out in Spain will be published in a supplement devoted to this subject to be issued henceforth by *Revista de Medicina Española* (Valencia). This section

has been entrusted to Dr. Beltran Baguena.

The Spanish Gerontology Society proposes to issue periodical invitations to foreign lecturers, and especially to those engaged on gerontological investigation, and it hopes to receive grants for this purpose from the Public Health Department. In any case it is already certain that this Department's estimates will in future include assignments for sociological and research work in the field of gerontology.

Dr. F. Vega Diaz
Spanish Correspondent
American Geriatrics Society.

SHOULD YOUTH BE SERVED?

THE AMERICAN sexual and physical delusion concerning the prevalence of youth, with beauty as its natural concomitant, could be laughed off as the folly of a country that is still young if the effects were not so serious. But its complete absurdity in these days is best shown by the steady increase in longevity of our population. When a young woman's average expectancy of life is over seventy years, and a man's only five or six years less, it behooves us to conceive of youth as a brief interlude in the long chain of years. We should begin to think of maturity and old age, not as the enemies of life, but as a reasonable and rewarding part of everyone's destiny. We can indeed rejoice while we are young, but there must be developed in our consciousness a cheerful anticipation of the years to come.

If the later years of life are considered only as an affliction, a kind of disease that, in destroying the physical traces of immaturity, removes us from the affection and regard of the rest of mankind, then it is a malady that is falling upon other nations than ours. In England, for example, where we have been taught that personable men and women are content at any age with what their mirrors show them, over thirteen per cent of the population is of a pensionable age. When we have in this country more than twenty million people over fifty-five years old, a little reflection on everybody's part will force the institutions and businesses who continue to foster our national frenzy to take heed.

We need a science of gerontology, the study of human life in man's later years, for both increasing birthrate and longevity are presenting us with economic and social problems we are not in the least equipped to solve. Mankind will live to still greater years, and the millions to come who when they reach fifty can contemplate twenty or thirty more active years of life, must be taught, as did the ancients, to regard age as a blessing, the time for reason and calm content, the time for peace when the fevers and the fantasies of youth are stilled. Above all, we need writers who are more concerned with mature happiness than with childish passions, for we must look upon our whole lives as rounded and complete, each decade a cherished part of the whole, and all of them given to us for the achievement of the final reward, a life-long purpose that has been achieved, and true knowledge that has been won.—Reprinted from an editorial by Harrison Smith in The Saturday Review of Literature.

DIGESTS *from Current Literature*

Some Aspects of the Management of the Elderly Patient.

HOWARD K. RATHBUN, M.D., *Southern Med. J.*, 41 No. 2: 153-156 (February) 1948.

Certain differences in senescent people account for the distinction between "normal" and "abnormal" or morbid old age, connected with the more or less pronounced decrease in reserve capacities. It must be borne in mind that, in intelligence tests, the best-scoring twenty-five per cent in the seventies exceeds approximately forty per cent of young men at the peak age.

The proper evaluation of disease is more difficult in older patients than in younger ones. It may not be safe to assume that because overt evidence of disease of an organ-system is not present, that such organ-system is capable of carrying out its functions in a satisfactory way in the presence of increased stress, due to a disease process elsewhere, for instance, appearance of hyperglycemia, acidosis or azotemia in the presence of a systemic infection. Reserve powers are decreased often for more functions in the aged than in the young.

Besides, there is a tendency to be so overprotective in the care of the aged that the old patient is not allowed to carry out even the simplest tasks, which may lead to a sense of frustration and even to violent emotional outbursts. The attempt to prevent this attitude is the obligation of the physician.

The Old Age Counselling Center in San Francisco offers, among other suggestions, that the patient be asked to keep an hourly record of his activities for a week, this being analyzed with the patient for interest in various topics, then an attempt is made to direct the patient's energies toward those activities. An effort is also made to minimize the wasting of time and energy in boring pursuits which are non-productive.

The medical profession may, through local and national societies, exert its influence toward the establishment of guidance centers for older patients, such as the Forty Plus Clubs, where the aged may come into contact with others with similar problems.

Emphasis should be placed on creative hobbies; to be important and useful is the very thing most likely to produce happiness and satisfaction in older people. If possible, the patient should have some responsibility given him. Few higher cultural attainments exist than the suitable provision for the aged and infirm.

Bibliography of 15 references.

Essential Hypertension: Prognosis and Comparison of Medical and Surgical Treatments.

WATSON F. ROGERS, M.D., AND ROBERT S. PALMER, M.D., *American Practitioner*, 1 No. 9: 459-465 (May 1947.

The clinical characteristics and classification of essential hypertension are discussed in relation to prognosis. When therapeutic effectiveness is judged by a persistent lowering of the blood pressure to normal or near normal, dorsolumbar sympathectomy is twice as effective, as a general medical regime, plus the use of sulfocyanate, but after three years this is maintained in only 25 per cent of patients, though at least 60 per cent show some lowering of the blood pressure. Relief of headache and throbbing of the head by dorsolumbar sympathectomy amounts to nearly 100 per cent, while general symptomatic relief by medical means varies from 90 per cent in grade I (mild) to 46 per cent in grade III

(severe) and is, as a rule, only temporary, and in a smaller proportion with malignant grade IV hypertension (with papilledema).

Sympathectomy at this time is regarded as the treatment of choice in malignant hypertension if renal impairment is not marked and there is no frank congestive heart failure. Operation may be offered to those patients with variable benign hypertension without evidence of diffuse irreversible arteriolar disease whose blood pressures by internal observations appear to be growing worse.

We are reminded that in many cases, perhaps in the majority, essential hypertension is compatible with a long and active life; often it is not accompanied by symptoms for a great many years.

One figure; 5 tables; bibliography of 5 references.

A Consideration of the Effect of Androgen Control Treatment of Carcinoma of the Prostate.

CHARLES C. HERGER, M.D., and HANS R. SAUER, M.D., *New York State J. of Med.*, 47 No. 5: 494-501 (March 1) 1947.

A study of results obtained by hormone therapy in a series of 130 patients with prostatic cancer is presented. The treatment in these cases dated back to from two and one-half years to four and one-half years.

After initial benefit, resurgent symptoms develop in the majority of the cases after variable periods of time. This indicates that hormone therapy in its present form does not cure nor retard the disease indefinitely.

If giving estrogen, small daily doses of 1 to 3 mg. of stilbestrol are being recommended. Indiscriminate use of orchidectomy in patients with prostatic cancer is decried. Castration should be reserved for patients in whom immediate relief from pain is urgently desired, or patients in whom estrogen administration has lost its effectiveness. Estrogen administration given in cases of failures following castration is usually ineffective, while failures occurring following exclusive estrogen therapy show fair response to subsequent castration.

Androgen control therapy does not prevent formation of metastases in patients with apparently quiescent disease. Its value in this type of case is questioned, and it is suggested to reserve hormone therapy until the disease shows signs of progression.

Results accomplished by employment of x-radiation over the pituitary are reported. A certain degree of palliation with prolongation of life has been accomplished by this procedure. Two hundred kv. x-radiation (half-value layer, 0.9 mg. Cu., 50 cm. skin target distance) has been applied, and the pituitary was irradiated from two lateral and one anterior field. The average survival time until death was twelve and three-tenths months after resurgent symptoms became manifest in a group of 20 patients who received x-radiation over the pituitary, while an average of only seven and seven-tenths months elapsed until death occurred in an analogous group of 43 patients who had not received such treatment.

Bibliography of 16 references, 5 tables.

Vascular Degeneration.

EDWARD L. BORTZ, M.D., *Kentucky Med. J.*, 46 No. 7: 257-263 (July) 1948.

Over one-half million lives are being destroyed every year by some form of vascular degenerative process. As more individuals are living into later years, the mortality rate will mount even higher unless something is done about it. Important clinical researches now under way for the study of significant contributory factors leading to vascular degeneration include alterations in the fat metabolism, particularly cholesterol, obesity, hypertension, and nervous disorders. Through understanding these conditions more clearly, more effective measures may be applied to delay the

destructive ravages causing vascular degeneration.

As regards arteriosclerosis, interference with the oxygen supply to tissues in the wall of the blood vessel may be caused by manganese, mercury, lead, carbon monoxide, carbon disulfide, the nitrates, nicotine, and iodine. Excessive use of adrenalin, histamine, vitamin D, the parathyroid hormone has been shown to cause fibrosis of the myocardium. Hypotonic agents may injure the lining of blood vessels and increase the permeability of the vessel wall.

Page believes that there are two leading factors in the production of atherosclerosis; blood fats and prolonged high blood pressure; the first being chemical in nature and the other the result of mechanical strain. In prolonged hypertension the mechanical factors may predominate and atherosclerosis apparently may result in the absence of hyperlipemia.

Cholesterol rich foods should be gradually withdrawn from the routine diets of people over forty because of the lessened need of cholesterol by the body during the latter half of life.

The vaso-constrictive effects of tobacco in susceptible persons has to be kept in mind. The therapeutic use of alcohol in individuals over fifty has long been accepted recommendation.

Radioactive tracers now available will furnish a great deal of information concerning initial lesions and subsequent intermediary alterations in tissues, enabling us to trace step by step the change from the normal to the abnormal; protective measures may be planned on a rational basis when the causative factors producing breakdown of the tissues are revealed.

Bibliography of 11 references.

Onset of Peptic Ulcer in the Aged.

HENRY A. RAFSKY, M.D., MICHAEL WEINGARTEN, M.D., AND CHARLES I. KRIEGER, M.D. *J.A.M.A.*, 136, No. 11: 739-742 (March 13) 1948.

In a previous report of 408 cases of bleeding peptic ulcer, it was observed that 56 or 13.7 per cent were in patients over the age of sixty years. Further investigation revealed that in 25 of them the first symptoms of ulcer occurred after the fifth decade. Recent study of the gastric secretory response in the aged showed that 12.7 per cent of persons over 65 had hyperchlorhydria.

The present study is based on a series of 1,800 successive hospital admissions for peptic ulcer. 81, or 4.5 per cent, had no symptoms referable to ulcer prior to reaching the age of 60. Fifty-eight per cent of the 81 patients had complications of ulcer on admission. Hemorrhage was the chief complaint in 38 per cent of the cases. The mortality from hemorrhage was 10.7 per cent. No case of bleeding was treated surgically. Liberal use of slowly administered citrated blood infusions and transfusions are advocated in the treatment of hemorrhage in the aged. Hypertension is not a contraindication to these measures.

Perforation was the initial evidence in 13.8 per cent, and the mortality of this complication was high. Pyloric obstruction due to ulcer in the aged often yields to medical therapy. If the obstruction is refractory to the above, surgical treatment is imperative. Complicating diseases play an important role in the prognosis of ulcer in elderly patients.

Atropine or belladonna even in therapeutic doses may precipitate acute glaucoma; soluble alkalis should never be used in patients with impaired renal function. Aluminum hydroxide preparations are preferable. Addition of magnesium trisilicate may obviate occurrence of fecal impaction.

In elderly patients with impaired renal function, occurrence of extrarenal azotemia adds to danger of hemorrhage. To combat high levels of nonprotein nitrogen, fluids must be administered parenterally not to exceed 3 per cent of the body-weight in twenty-four hours.

The Meulengracht regimen should not be used in the treatment of ulcer

in the aged, suffering from hemorrhage.

Barbiturates are preferable to morphine as sedatives; the latter administered during hemorrhage may interfere with the vasomotor reactions and intensify circulatory inadequacy.

Experiences with Early Ambulation as a Prophylaxis of Thrombosis.

ERNST F. FRITZSCHE, M.D., *Therapeutische Umschau*, Bern, 4 No. 1: 9-16 (April) and No. 2: 26-29 (May) 1947.

Without doubt modern surgery owes the outstanding development to its present perfection particularly to the fact that certain important accidents and contingencies during and after operations has been applied at the hospital which is the formerly prevailing custom of keeping patients who had been operated on in bed for an indefinite period.

Early ambulation following operations has been applied at the hospital of the Canton Glarus (Switzerland) since 1941, after it was found that long bed rest with administration of thyroxin and sympatol, associated with exercise and massage, had failed entirely, since in spite of these prophylactic measures, the mortality through postoperative thrombo-embolism remained high.

The results of the new method, regarding prophylaxis of thrombosis through early or very prompt rising after operations, are considered very satisfactory, especially in elderly patients. The mortality due to embolism has diminished from 3.25 to 0.19 per thousand during 5 years, while formerly for the same period, when long bed-rest was applied, a reduction of only 3.21 per thousand had been attained. Through getting up immediately, the morbidity of thrombosis in patients operated on for hernia was reduced from 5.9 per cent to 0.2 per cent.

In fact, through the new method a number of different types of postoperative disturbances are avoided, such as the patient's sensation of feeling ill, disturbances of the circulation, intestinal atony, trouble with micturition (especially in the aged), insomnia, lack of appetite and pulmonary complications. The psychic condition and behavior of the patients is also favorably influenced thereby. Furthermore, the hospital stay is shortened; thereby the period of inability to return to work is reduced considerably. Besides, elderly patients, now being informed of the lesser risk involved in operations, are much more readily inclined to submit to interventions of this type.

The numerous disadvantages of early or immediate ambulation which had been predicted by many authors never occurred. Resistance on the part of the patients, fainting spells, or other accidents have never been observed. Traumatic pain could easily be reduced to a tolerable minimum, or even eliminated. The recovery and healing of wounds take place without complications, and at least as rapidly as in bedridden patients.

The operative success was by no means influenced thereby. In 821 patients operated on for hernia, occurrence of hernial recidivation was reduced from 11 per cent to 7.5 per cent through immediate ambulation.

Bibliography of 41 references.

Physical Medicine and Geriatric Problems.

TREVOR H. HOWELL, M.R.C.P., Ed., *The British J. of Physical Med.*, 11 No. 2: 40-42 (March-April) 1948.

Until the introduction of sulphonamide drugs, a great many of the diseases of old age were practically incurable. Pneumonia and common urinary infections are no longer considered hopeless cases, even in senescent patients, yet a large number of common disorders of the elderly remain resistant to ordinary medical treatment. Three problems especially presented themselves as needing immediate attention: The first, management of hemiplegic patients; the second, relief of persistent bronchial

spasm and the third, treatment of contractures, in the therapy of which the armament of physical medicine was employed.

Regarding hemiplegia, patients having suffered a cerebral thrombosis usually reach the physiotherapist too late. The first six weeks are the period during which changes can be initiated most easily; delay may mean defeat. The practice adopted in the Geriatric Unit of St. John's Hospital is at first to encourage the patient to grasp his hemiplegic limb with the sound one and to move it about as much as possible from the beginning. Later the patient was lifted into a chair, placed at the foot of the bed. The patient lifted his weak arm with the strong one and gripped the bed rail with both hands. He was then encouraged to pull himself up into a standing position, whereupon each arm was lifted off the rail in turn. Likewise, the feet were raised from the floor, one at a time. After a few weeks the patient was ready to learn to walk again. In chronic cases where the hemiplegic limbs were too weak, stimulation of the extensor muscles with the faradic current was employed as a preliminary to exercises, with excellent results.

In cases of chronic bronchitis, injection or inhalation of adrenaline, Benadryl, or treatment by diathermy was used; as a rule the patients tolerated a current of 1,000 milliamperes with comfort.

Contractures often require mobilization under local anesthesia. Injections of 10 cc. of procaine around the contracted tissues will usually allow the first steps towards stretching to be taken. Another promising method is sodium chloride ionization of the fibrous areas, combined with faradic stimulation of the antagonist extensor muscles. When starting, the motto should be "little and often" with an increase of 1 or 2 degrees a week regularly, over a long period. There are few cases which are too far advanced for such treatment, if the will to recovery is present.

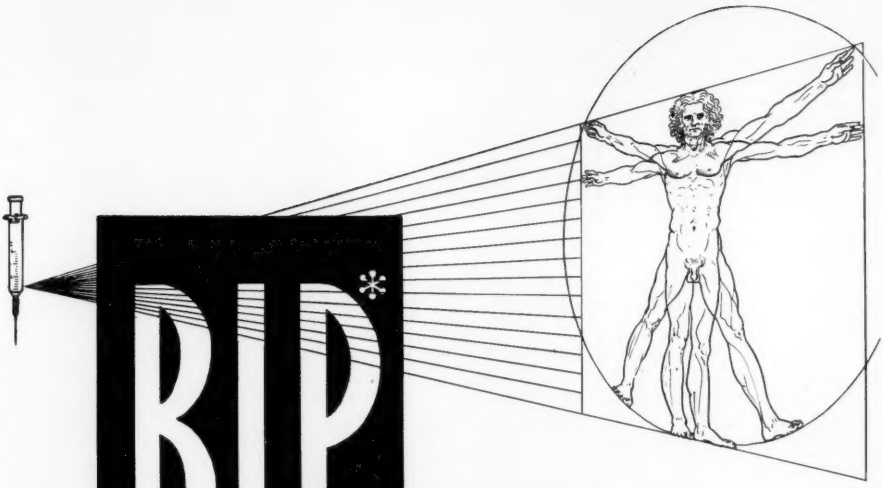
Generalized Osteoporosis in Old Age.

C. M. Kesson; N. Morris and A. McCutcheon, *Annals of the Rheumatic Diseases*, 6 No. 3: 146-161 (September) 1947.

It is well known that frequently the bones become rarified in old age, and it is commonly believed that this rarefaction or osteoporosis is a physiological process. The main factor in the origin of this condition is believed to be long-standing calcium deficiency. If this view is correct, senile osteoporosis must be included among the disorders of calcium metabolism, attention must be paid to the dietary requirements of the aged, and the possibility considered of calcium metabolism in middle and old age differing from that of younger adults. Albright came to the conclusion that menopause may be a potent factor in the production of osteoporosis and, therefore, recommended the use of stilbestrol as a therapeutic agent. Black found that senile osteoporosis is four times commoner in females than in males. The possibility of some dysfunction of the sexual hormones as a causative factor must, therefore, be considered. After the age of fifty, the female is more liable to suffer from rarefaction of the skeleton.

It appears that there is a tendency for the phosphatase to increase even in healthy subjects in the later years of life and that this increase is accentuated if osteoporosis is present.

Suggestions for the alteration of calcium metabolism are made; treatment with an adequate diet, including milk, cheese and eggs, supplemented with salts of calcium and phosphorous and vitamin D was given. Symptomatic improvement was found in 54 per cent of the patients; when treated for six months or longer, 70 per cent improved symptomatically. Owen carried out calcium balance experiments and found that the aged were capable of



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storing calcium and phosphorous when given diets containing more of these elements than their customary intake. It is also possible that although absorption of the above is normal in senile osteoporosis, these minerals may be used for other purposes than bone formation; for example calcium may be deposited in the walls of arteries, ligaments, and so forth. So far, it has not been possible to produce radiographic evidence of calcium deposition in the rarefied skeleton with a diet rich in calcium and phosphorous; this may be due to the mineral loss being so great, or to the osteoporotic process being irreversible in the aged. However, through appropriate diet it may be possible to prevent further decalcification and the occurrence of complications. Calcium intake well in excess of 1.0 g. for periods of a year had no effect on blood pressure.

Six tables; bibliography of 38 references.

Blood Changes in the Aged. Part II.

OSCAR OLBRICH, M.D., *Edinburgh Med. J.*, 54 Nos. 11-12: 649-656 and 55 No. 2: 100-115 (Nov. - Dec.) 1947, and (Feb.) 1948.

Red cell population of the aged is distinctly different from that of the young, whereas quantitative data in regard to erythrocytes, hemoglobin, color index, total cell volume and average corpuscular volume are not different. The mean cell diameter, however, is distinctly larger in the old, and the scatter distinctly bigger.

The fragility of the red cell population, as measured by the osmotic resistance to different concentrations of salt solution is decidedly increased in the aged. The "hyper-resistant" cells, hemolyzed only when the sodium chloride concentration is lower than is necessary for the normo-resistant cells, from 84 per cent to the 100 per cent level, behave similarly in both groups; the increased fragility, therefore, applies only to the normo-resistant cells (a term used for all cells from 16 per cent up to 84 per cent). Below 16 per cent the author has termed them "hyporesistant" cells. The variability of fragility is much greater in the old than in the young, regarding both the normo- and hyper-resistant cells. The fragility differences also indicate a markedly greater number of hyporesistant cells in the blood of the aged.

The blood sedimentation rate is increased in old age and is a function of the plasma proteins; other factors being equal.

The total white blood cells are present in equal numbers in both groups, but the differential count shows an entirely different behavior as regards the number of lobes. Cells were seen containing more than 5 lobes with scanty or no granules in the cytoplasm.

The non-protein nitrogen shows a distinct increase with advancing years; however, not beyond the normal range.

Author's hypothesis is that the bone marrow produces in one time-unit a lesser amount of leucocytes and red cells; however, the rate of destruction is also diminished.

Six figures, 11 tables, bibliography of 84 references.

The Old.

EDITORIAL. (From *Times*, January 30, 1948.) *The Lancet*, London 254 No. 6495 (Vol. 1, 48 No. VIII) February 21, 1948.

Old people of Holborn, London, were recently given the opportunity of meeting and offering suggestions to the Old People's Welfare Committee of their borough. One appealed for more visiting in the home, another for a meals center to supplement their diet. One person appealed for cheaper coal for the old, and some way of sparing them from queueing. Free service for foot troubles is now being provided by the British Red Cross Society.

Ninety-five per cent of old people are forced to live with their families;

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the Minister of Health emphasizes that a great deal of unhappiness results from this. The association of the young and old should be voluntary—one of the many things to be achieved by better housing. Dr. Greig Anderson divided old people into four groups: 1) the elderly, relatively healthy, able to live in their own homes; 2) the elderly and infirm, incapable of running their homes; 3) the aged sick, subdivided into the acute sick, the long-term remediable sick, and the group now considered irremediable; and 4) elderly psychiatric patients, divided into those who can be looked after at home and those who need mental-hospital care. For the relatively infirm the hostel is the best solution. The need for absolutely free passage between the patient's home and the hostels or hospitals is emphasized. Short-stay hostels are now being opened in certain areas, where old people can go for a week or two, while their companion who normally looks after them, takes a vacation.

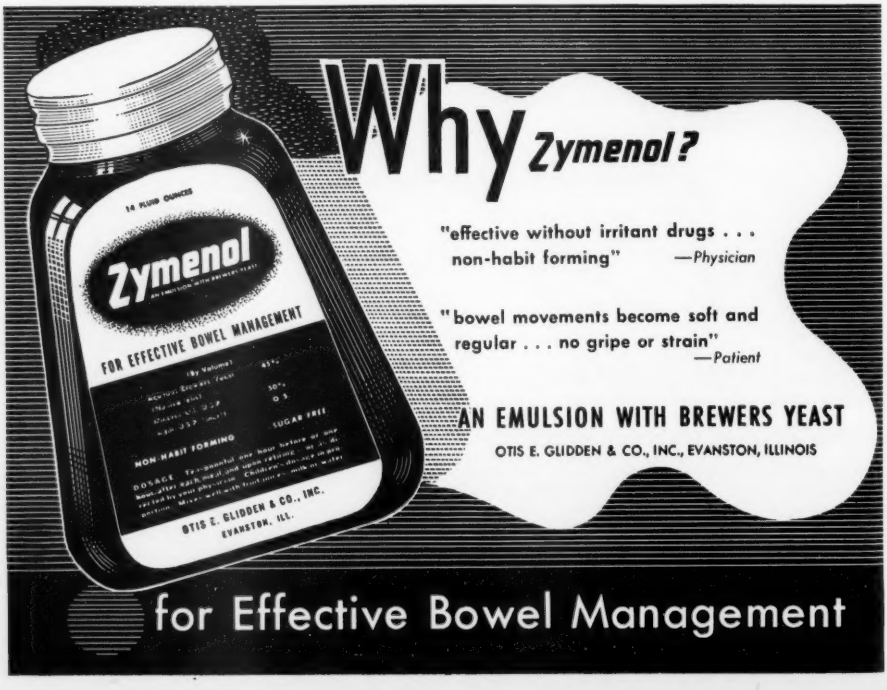
Age and Weight as Factors in the Development of Experimental Cholesterol Atherosclerosis in Rabbits.

O. J. POLLAK, M.D. *Archives of Pathology*, 43 No. 4: 387-392 (April) 1947.

Under analogous experimental conditions, rabbits one year of age responded to cholesterol feeding with atherosclerotic alterations of the aorta, while rabbits 25, 10 and 5 weeks old, did not respond in that manner. All rabbits, however, regardless of age, reacted with hypercholesteremia of almost equal degree.

Atherosclerosis of varying degree developed in 4 of the 6 rabbits, which were one year old. The earliest manifestations were observed in a rabbit fed cholesterol for thirty days only.

It seems, therefore, that the rabbit's age and weight constitute important factors in the development of experimental cholesterol atherosclerosis and should always be noted.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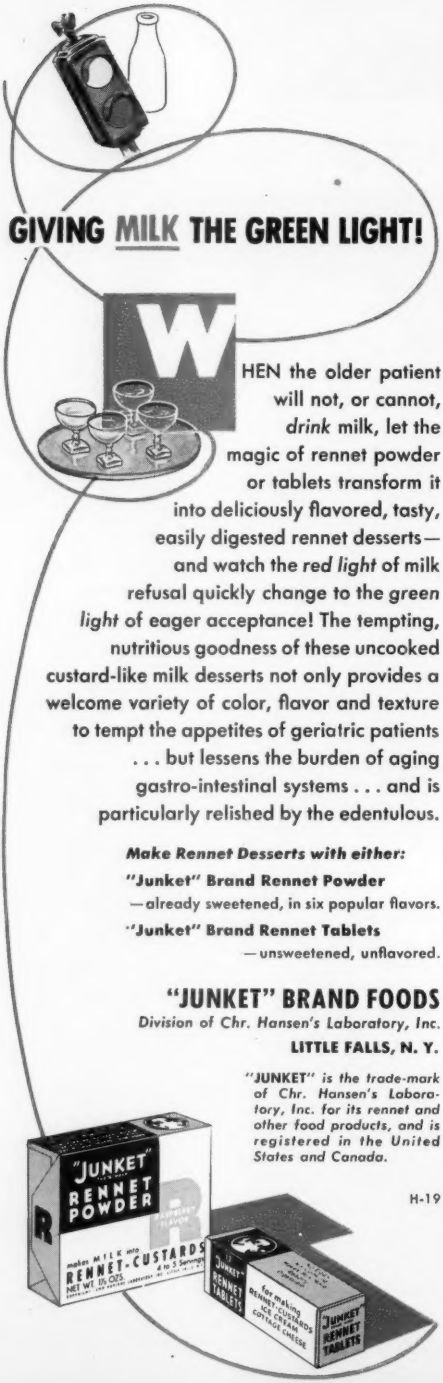
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RENNET TABLETS

The Anesthetic Management of the Aged.

CHARLES S. TURVILLE, M.D., and ROBERT S. DRIPPS, M.D., *Pennsylvania Med. J.*, 51 No. 4 : 434-436 (January) 1948.

As regards preoperative medication, it is generally accepted that the aged are intolerant to opiates and sedatives of the barbituric acid series. Evidence of susceptibility to morphine may take the form of severe hypotension or alterations in respiration. As a result, anoxia may occur and psychic changes may follow. As a rule, only atropine is administered prior to anesthesia.

The aged patient has a high pain threshold; this makes him often ideal for regional anesthesia. However, reactions to local anesthetics are more common in the aged. Tissue irritations may interfere thereby with tissue repair. Supplementation of an inadequate block may be attended with hazards of excitation, vomiting and aspiration of gastric contents into the tracheobronchial tree. Spinal anesthesia is associated with by far the greatest incidence of hypotension on the operating table (33 per cent), as compared to general anesthesia (12) per cent.

A pentothal combination intravenously and 60 to 70 per cent nitrous oxide by inhalation proved a valuable technic for reduction of fractured hips and other procedures in which marked muscular relaxation is not required. Cyclopropane likewise proved useful in many instances, but the incidence of postoperative psychoses was greatest after this agent.

Concerning postoperative complications, the lowest incidence of pulmonary complicating occurrences followed administration of pentothal, the highest when spinal anesthesia was used.

The mental balance of the aged patient hangs on a tenuous thread. This incidence is highest with general anesthesia.

As a rule, old people do exceedingly well on a surgical service. However, early ambulation is essential. Intravenous fluid therapy must be carefully watched to avoid circulatory overload. Fluids may be given by hypodermoclysis if the oral route is impossible.

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The Use of Vitamin E in Menopausal Syndrome.

HOMER E. FERGUSON, M.D., *Virginia Med. Monthly*, 75, No. 9, 447, (Sept.) 1948.

The patient approaching the climacteric may show a reduction of flushing and hot flashes, of emotional instability and irritableness, and relief of basal menopausal headaches when treated with alpha tocopherol (Vitamin E). In sixty-six patients treated with Vitamin E there were no side reactions such as the dizziness, soreness of the breasts, pelvic pain, vomiting, headache, or nausea which may accompany the use of estrogens for the same purpose.

The dosage schedule is 5 mg. of alpha tocopherol administered twice daily after meals for six weeks followed by a like amount of the vitamin given once a day as long as necessary.

The use of Vitamin E in the menopausal syndrome does not induce or disturb carcinogenic cellular activity which is an effect observed at times where estrogenic hormones are being prescribed.

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GERIATRICS

Psychological Orientation in Geriatrics

Edward B. Allen, M.D.*

GERIATRICS is more than the mere practice of total medicine concerning patients in the later decades of the life span. It is an art rather than a specialty. It requires a breadth of vision and a knowledge of both the somatic and the psychic factors involved. While an acquaintance with the morphology, physiology and pathology of tissues, organs and the systems of the human body of which they are composed is essential and fundamental in the practice of this art, it must be remembered that this body is invested with a personality and a consciousness of its existence. The human body possesses a highly developed brain and an especially intricate cerebral cortex which enables it not only to function involuntarily but also to be endowed with a certain amount of volition expressed in behavior and motivated by thoughts and feelings. Geriatrics must direct its attention to these thoughts and feelings of the aging as well as to their morphology and physiology.

The mind and the body can never be divorced, but attention may be directed to the psychological level of integration of the aging as well as to the physiological level, remembering that they are interdependent. While aberrant psychological reactions leading to personality disorders are problems for the psychiatrist, there are many psychological reactions in the aging still

Presidential Address at Annual Dinner, Fifth Annual Meeting, American Geriatrics Society, June, 1948, Chicago.

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within the realm of the normal or average for any age group that may be recognized by the general practitioner and the specialists in fields other than psychiatry. The difficulty lies in the fact that they are often so self-evident that they are overlooked, or the physician being more or less aware of them within himself may have built up a defense against them, and thus have projected a similar defensive attitude toward his patients.

IT IS THE purpose of this presentation to enumerate some of these factors and indicate how their recognition will enable us to resolve many of our aging patients' conflicts, frustrations and fears before they have reached too distressing proportions. Each decade of the human life span has its emotional problems and its moments of uncertainty which vary to some degree from the preceding or subsequent decades. There are two periods, that of puberty and involution, in the lives of all human beings, if they live long enough, which are intimately concerned with their instinctive drives. They frequently feel insecure from emotional tensions for which they need relief through knowledge of the tension's etiology. The approach to these problems should be conservative and temperate.

AT PUBERTY the instinctive drive for propagation or race preservation is more or less quickly and consciously superimposed upon the previous instinctive drive for self-preservation which deals chiefly with growth, development and self-defense. A conflict often arises in youth between these two instinctive drives. If the conflict becomes too acute, it leads to perplexity; the victim seeks relief in withdrawal from the realities of life, avoids the responsibilities of reproduction, and may build up a delusional defense against them. Such reactions are frequently schizophrenic in character.

In the involutional period the more or less adequate adjustment between the instinctive force for self-preservation and race preservation maintained through middle life is no longer adequate and the establishment of a new physiological adjustment and psychological attitude is required. The instinctive drive for race-preservation abates, sometimes reluctantly, and the more fundamental drive for self-preservation now reasserts itself more consciously. The person passing through this involutional period becomes more aware of self and frequently somewhat less concerned about others. He begins to appreciate and often fear that he is aging. He has reached the stage when change is inevitable, and it is difficult for him not to resent it. He debates within himself, trying to determine how many more years of his life span are left him. Having weathered the storms of adolescence, he has for many years been absorbed with the problems of the present and has had relatively little time to think of the past or the future. He has been able to face reality. But now he is forced to change his philosophy and his former ordered pattern of response. If he becomes disturbed or apprehensive, his personality

reaction is generally emotional and depressive in character rather than schizophrenic. He may distort reality and exaggerate his limitations, but he does not replace his environment entirely with one of his own phantasies.

MANY individuals blessed with a well integrated physical constitution and with little sclerotic change in their cerebral arteries continue free from memory impairments, preserve their zest for living, still externalize their affections and live into the seventies, eighties and possibly the nineties, active and alert. Others are less fortunately endowed both physically and psychologically, but they may continue to function with varying degrees of adequacy. What is it that characterizes growing old? From a physical point of view, a man continues to be as old as his arteries, but what are the associated psychological correlations?

While many of these psychological phenomena may be considered as neurotic or as evidence of psychosomatic problems, or even of psychopathology, let them also be looked upon as evidence of senescence without psychosis. Let them be also considered as problems which can be understood and treated extramurally by the thoughtful physician who is willing to take time to listen to them as they are revealed by the aging patient. They are the phenomena that are revealed by a careful and painstaking history rather than by the laboratory or the physical examination, although the latter should always precede the interviews in which these phenomena are elicited.

OFTEN THE first indication of senescence occurs around the age of fifty. The initial and most frequent complaint is that of fatigue. Next, there is an inability to function as efficiently or as rapidly as before. It takes the older person longer to recuperate than it did when he was younger. The biological factors seem to precede the psychological. In men there is a gradual decrease in strength, skill and endurance which is also reflected in a gradual diminution of sexual prowess or potency. Although desire may remain, it is apt to be more intermittent in character. With women the first concern following a sense of fatigue is an awareness of the gradual loss of physical attractiveness and concern about being no longer able to bear children. Sexual desire may show no appreciable diminution. Both sexes are aware of more conscious effort in obtaining the gratifications of former years, physical, sexual, mental, social and economic. With these feelings of frustration, visceral tensions and dysfunctions often appear. Constipation, pyloric and intestinal spasms, flatulence and complaints of indigestion arise. Frequently the victim will exclaim, "I can't eat the things I used to."

On the psychological side fatigue often manifests itself in an appreciation of frustration. External stimuli lose their zest and novelty. A cynical attitude develops toward the anticipations that formerly caused pleasure. As age advances and there is increasing difficulty in remembering names and events, some consolation may result from a feeling of justification in recalling that there are more names and events to remember. But the senescent gradually

becomes loath to add to the accumulations of his knowledge. As the duration of his earthly existence shortens, he seeks compensation by retreating to his prolonged past and to reminiscing. But even this leads to difficulties. As he grows older, his associates of former years pass on to the great beyond, and he has frustrations in finding anyone of sufficient years to recall "the good old days" with him.

Many aging people, who have turned from the religious faith of their fathers under the competitive rivalries and economic stresses of middle age, seek consolation in religion again as they think of "the Hereafter." To some this may appear as an illusional compensation, but to more it is comforting to think they will be with their loved ones again in a better world. Nature effects changes of temperament and resultant emotional compensations where science offers only stern realities.

The senescent appreciates that some change is taking place within him. Often an anxiety arises and an associated fear that something of a physical nature is radically wrong. The anxious individual consults his physician, but in spite of the latter's reassurance, he is sure that the physician has overlooked something. He leaves the doctor's office indignant that all examinations have proved negative. Before consulting another physician he may listen to radio advertising, read of some panacea in a magazine or be informed by a friend about what is "a sure cure." When such vicarious therapies prove ineffectual, fear becomes paramount in this aging individual's mind. He anticipates invalidism, cancer, a possible operation, or even death. In a highly agitated state he may consult the same or another physician. If the physician has the courage to suggest a psychiatrist, he is apt to lose not only the confidence of the patient but also of the members of the patient's family. The patient is indignant at the inference that there is anything wrong with his mind. His relatives assure him it cannot be, for there was never any insanity in their family. The patient and his associates are unaware of the emotional factors involved in this objectively intangible illness. The physician may be aware of the emotional situation, but he is frequently at a loss how to proceed. Under such circumstances a tactful psychiatrist may be able to allay the anxieties and enable the referring physician to remain the family counselor. They should work together in harmony.

THE AGING individual may fall into the hands of a quack or a cult, or he may give up his work and remain at home a chronic invalid, complaining of fatigue, weakness, nervousness, inability to leave the house and of visceral tensions, palpitations or urinary frequency. He may even simulate symptoms which lead to unnecessary operations being performed. Or he may try to overcompensate by denying that there is anything wrong with him and annoy others with his repetitious insistence that he is as competent as ever. His emotional inadequacy may be further displayed by evidences of resentment and jealousy directed against people younger than himself. Under

such tension he may eventually develop vascular hypertension and some day drop dead from cardiovascular disease.

If our aging person is a woman, she may disguise beginning atrophies of the skin and resulting wrinkles with cosmetics. She may even dye her hair. When such subterfuges fail, she may develop complaints referable to the cardiovascular, gastro-intestinal or genital system. Thus, with a repetitious recital of her aches and pains, largely the result of her inner tensions, she may, at least for a time, attract the attention and sympathy of her family and friends. In this way she seeks a compensatory recognition for what she previously accomplished through sexual attractiveness. Eventually, like her male counterpart, after she has outlived her family, who have exhausted themselves through constant attendance upon her, she may end up in a home for the aged, still demanding attention, but less rigorously than in former years. A man may be equally vain of his appearance and in an endeavor to keep up his prestige and maintain economic security may attempt to conceal his baldness with a toupee and a midriff bulge with an abdominal belt. Both the man and the woman have now become the slaves of their mirrors, where formerly they could look into them with a masterful vanity.

One of the greatest sources of embarrassment and one that frequently entails painful misunderstandings for the older person is to have his children or the younger generation look upon him as a sexless individual. Both men and women as they grow older frequently have to repress what might be considered consistent emotional attitudes toward members of the opposite sex because of prevailing social taboos. It is important to remember that some persons suffer little reduction in their sexual functional capacity up to an advanced age and that most retain some personal interest to the end of their lives. There is greater variability reported for sex activity throughout maturity than for many other functions of the body. Thoughtful reflection and careful consideration should be given to the restrictions we place upon the biological urges of others. The inference should never be drawn that they are necessarily like one's own. In homes for the aged the strict segregation of the sexes often provokes unanticipated complications and undue emotional frustrations. Provision should certainly be made for married couples to live together. Frustrations often present greater problems than conventional gratifications of instinctive urges. When a sexual misadventure befalls an older person, the threat he anticipates of failure, ostracism or social retaliation is likely to precipitate in him the fear, guilt, apprehension and remorse to which he has long been conditioned; these in turn may lead to neurotic patterns of anxiety, hypochondria, compulsion or depression.

After fifty a gradual diminution in sensory acuity often occurs. This frequently manifests itself in impairments of audition or vision. The ability to maintain one's level of social acceptability or to have one's opinions and attitudes remain appropriate to those of the community is maintained only

through adequate interchange and effective communication with one's social environment. When these sources of interchange and communication become inadequate through failing hearing or vision, the individual tends to more or less isolate himself. As Cameron expresses it, a "social disarticulation" takes place. He points out what may result. "Partial isolation, particularly when it eliminates the daily conversation of others, encourages misunderstandings and misinterpretations on both sides which usually require a great deal of patience and forbearance to correct. The half-deaf and half-blind are notoriously given to suspicion; and suspicion makes few friends when one is old, fretful and unhappy. If suspicions go uncorrected, they tend to build upon themselves. The real motives of the real community become distorted into the imagined motives of a hostile or indifferent pseudo-community. The loss of emotional support which such social disarticulation entails leaves the isolated elderly person with increased anxieties, fear, and discouragement. Occasionally sensory impairment actually reduces the severity of old neurotic reactions, and particularly in persons chronically oversensitive to noise and light."

THE METHODS for allaying the anxieties of the aging and the techniques for lessening the severity of their personality inadequacies are many and varied, but there are certain general principles that are applicable to all. Remember all human beings are under a compulsion to converse and express their feelings. If completely isolated, they will soon be talking to themselves. Never hurry the aging patient. Allow him time to fully express his point of view without interruption or the interpolation of an adverse opinion. In other words, learn from the patient and then advise through the wisdom thus ascertained instead of preaching to him out of the pseudo-sophistication of preconceived ideas. Be practical in advising what may be done to alter the situation and don't attempt to change the adjustment that has already been made in order to substantiate a theory or to make the existing problem more complicated. There is a psychological homeostasis as well as a physiological one, and the results are equally as disastrous when it is thrown out of equilibrium. Any alteration in the conditioned adjustment of the senescent should be made cautiously and gradually. Allow him to have as many of his possessions as possible; at least something he has invested with increasing emotional value through the advancing years. Help him to keep his possessions inviolate from the contamination of others. Make him feel that you are personally interested in him and share his interests with him. Whatever his environment may be, do everything possible to make him feel that he is contributing to it and is wanted in it. Let him have others of his own age group and of both sexes to associate with. And last, but most important, remember that as he is now so you may become. Treat him as you would wish to be treated when you have achieved a similar honor of longevity through obedience to nature's laws and philosophically recall that ultimately she practices euthanasia upon all mankind.

PSYCHOLOGICAL ORIENTATION IN GERIATRICS
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INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES

THE FIRST International Congress on Rheumatic Diseases ever held in the United States will take place at the Waldorf Astoria in New York May 30 to June 3, 1949, inclusive. This seventh International Congress is sponsored by the International League against Rheumatism. The host is the American Rheumatism Association in cooperation with the New York Rheumatism Association.

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The Endocrine Aspects of Gerontology

Henry H. Turner, M.D.*

IT HAS BEEN wisely stated that the aging process begins at the moment of contact between ovum and spermatozoon, for this moment marks the beginning of a perpetually changing balance between regeneration and degeneration of living substance. For some months, the balance lies wholly on the positive side, but even by the time a child is born it has become necessary to discard certain tissues which, although not degenerate, are no longer useful —the umbilical structures, and many erythrocytes, for example. Now, if we wish to be fatalistic, we can say that this particular state of balance is merely physiological, and thus all the degenerations of old age are physiological, and nothing can be done about the basic pattern of development, utilization and deterioration which affects every tissue in its characteristic way. Practically speaking, and fortunately, this is not entirely true.

There have come to hand many devices for prolonging the functional life of certain tissues. An example is the adjustment that can be made between physical and emotional stress and the functional capacity of a man's coronary arteries. There is little to be done, other than heroic experimental surgery, to improve the absolute quantity of blood supplied to the myocardium; but one can instruct the patient in ways of living which may make the existing blood supply serve adequately for a longer period of time. This is a sort of compromise which, while it does not make the patient physiologically any younger, does permit him to live longer. Medicine had maneuvers of this kind at its disposal long before the special science of gerontology was named.

BUT WHAT the laity expects, and indeed what medicine is trying more resolutely to accomplish, is to retard the basic deterioration in such a way that a patient is enabled to live more nearly the life that suits his fancy, without catastrophe and without compromise. In terms of the cardiac circulation, this research means ascertaining the precise mechanisms leading to cholesterol deposits in the coronary vessels, and preventing or delaying such deposits; while this is one of the outstanding root problems in medicine, it is as yet unsolved. Practically all the changes peculiar to advanced age remain in the category of the unknown, from the graying of hair, in which vitamins were recently implicated without gaining anything, to the profound alterations in mind and personality due to insufficient cerebral circu-

Read at the 5th Annual Meeting, American Geriatrics Society, June, 1948.

*From the Department of Medicine, University of Oklahoma School of Medicine, the Endocrine Clinic of University Hospitals, and Oklahoma Medical Research Foundation; Associate Dean, Oklahoma School of Medicine; Secretary-Treasurer, the Association for the Study of Internal Secretions.

lation. But I need not emphasize that all are the subject of intensive exploration and conjecture.

Although there has been no ideal solution of the general problem of aging thus far, in certain fields, and especially in endocrinology, there have been found some useful practical expedients. For example, it is realized that one of the normal events of advancing age is a decline in the functional activity of the testis; and indeed, this has been one of the most resented of all geriatric phenomena, prompting men to bargain their souls and explore new continents for a promised remedy. The testis has actually two functions, but in historic times men were not so much disturbed about the spermatogenic as about the androgenic function; with it they identified their "youth" or "manhood," and its decline was the saddest event that could be imagined. In the present day, we are not obliged to re-establish the androgenic function of the testis, for we have what I have termed an expedient, namely, to administer androgens in chemically pure form and in any quantity which may seem desirable. Thus, perhaps without impeding the aging process we can still make the patient feel as if he were younger. One is well able to improve the personal situation with testosterone but more significant is its effects upon certain basic physiological processes. However, the physician is obliged to take into account the remainder of the patient's gerontological phenomena, many of which are not affected by androgens.

IT IS DESIRABLE to examine more closely the role of androgens in aging, because new information suggests that we may achieve more than a superficial brightening of the pleasurable side of life. The balance between degeneration and regeneration, which has been mentioned, has an interpretation in respect to the individual tissue cell, that might be defined as a balance between catabolism and anabolism. The aging cell is one in which probably the anabolic processes are diminished with resultant loss or alteration of certain essential cell substances. Indeed, the changes in the individual cell are the causative agents of the changes in the entire organism. In a general way, the loss of substance is the loss of protein, which is the stuff through which life is particularly manifested, and is the result of an excess of catabolic over anabolic processes.

If we had some agent which could cause the anabolic processes to exceed the catabolic, we should be producing, for a time at least, a condition corresponding to physiological youth, although undoubtedly no one agent could effect all the necessary changes. This metabolic reversal has been observed with respect to certain physiological phenomena during the administration of testosterone and certain other androgens. The observation that less nitrogen was excreted by the kidney of patients receiving these hormones led to the significant studies of Kenyon, Knowlton and their co-workers, of Kochakian, Reifenstein, and many other able investigators which established that this was in fact a retention of protein nitrogen that had no representation in higher blood nitrogen levels, and was therefore traceable to the tissues

themselves. The patients gained weight, and the weight was due only in part to the small amount of extra fluid retained; the rest consisted of newly added tissue. Not only nitrogen, but also potassium, phosphorus and sulfur were retained, in measurable amounts that corresponded strikingly to the proportions in which these occur in proteins. It is evident that the improved anabolism affects muscles more than other tissues, but when we see a definite reversal even of pathological catabolism such as occurs, for example, in the bone matrix of patients with Cushing's syndrome who are given testosterone, it is logical to conclude that numerous kinds of tissue must be capable of adding new protein and seemingly reassuming normal function under the influence of androgens; when we find the organism as a whole adding protein, as has been shown in aging men and in premature infants during androgen therapy, it is apparent that we have here a general, constitutional anabolic effect of profound physiological importance.

THE PROTEIN-ANABOLIC effect of testosterone and its congeners has been emphasized here, because it furnishes the most striking single instance of reversal of certain phases of tissue catabolism. It is a critical question whether this is in fact a reversal of the aging process or merely an amelioration. However, the practical effect that is seen in the treated individual, the effect that causes the patient to insist upon continuing treatment, is one of improved vigor and well-being, with various ramifications such as optimism and an enhancement of intellectual powers. The result is as if the aging process had been modified at its roots by treatment. The patient feels as though a few years had been lifted from his age. He may or may not enjoy some exacerbation of sexual vigor; many patients who complain of impotence are so frequently cases of psychic disturbance, that the result in this one respect is not always predictable. But in important constitutional respects, a definite change results, embracing the appetite, enthusiasm for work, muscular strength and endurance, mental acumen, and a host of individualized features that make the patient feel better than he had felt in years. I do not presume to say why this is, but at least I submit that the protein-anabolic action is a possible and tenable explanation which ought to be considered for the present. And if this should be so, it will have to be granted that androgens intercede in the normal gerontological process.

As to more specific endocrine functions, our present information shows that the initial site of aging in the reproductive system is in the gonads. We know that the uterus of postmenopausal women is capable of responding to estrogens much as in earlier life, with occasional exceptions in which higher than usual dosage levels are needed. We know that the menopausal anterior pituitary is capable of carrying on its functions. The one critical point of failure with increasing age is therefore the ovary. The same considerations apply to the testis, except that its decline is less regularly observed within a specified age period. However, tissue response to sex hormones is unchanged in both sexes.

THESE considerations are of great theoretical importance. They illustrate the concept of organic age, or the life-history peculiar to certain individual organs, as an intrinsic feature of that organ, which comes to maturity in its own time, functions over a period of years, and then ceases to function under normal stimuli and a presumably normal metabolic environment, as a result of processes inherent in the organ and largely inaccessible to us by present means. Perhaps the atheromatous changes in the arteries are another such feature, one which would eventually appear in the arteries of every person who lived long enough, but one which appears prematurely in arteriosclerotic subjects, who are, as the saying goes, as old as their arteries. This one form of degeneration, producing functional disorders in so many body systems, is a common denominator for numerous senile manifestations. But it is equally possible that the arteries are merely the seat of what is primarily a metabolic disorder, the cause of which may be found in the fuller understanding of lipoid metabolism, just as the rarefaction and fragility of bones in the aged is a result of progressive changes in the metabolism of body protein and minerals. And this illustrates a second, a metabolic, form of age. It suggests a field of great promise for the kind of agents, quite possibly hormonal, which can modify lipoid metabolism in the favorable sense that androgens modify protein metabolism.

WHAT CAN BE expected of the hormones? Can they influence organ age? This is a peculiar factor which does not behave as one might expect: for example, in females with precocious puberty, the ovary may attain to normal adult function in very early childhood, and yet the menopause comes no earlier than in women whose puberty occurred at 13 years. There seems to be no hazard of "consuming" an organ so that its life cycle is expended prematurely; but at the same time, we see no evidence of prolonging the intrinsic activity of the gonads by any means we now have. Thus, if there were practical benefit, we could conceivably initiate puberty sooner; but we cannot extend reproductive life at the later end. Hormones *can* be used, in special circumstances, to reverse the damage done to organs such as the kidney, as in the treatment of uremia with testosterone, but this is not necessarily due to the accumulated damage of time and aging. Organ age is not yet subject to our control; metabolic age may soon be.

The hormones can, as explained earlier, serve in many ways to reverse metabolic time, or undo the effects of metabolic aging; we see this already with the limited variety of sex and adrenal steroids available. This prompts mention of the general metabolic hormone, of the thyroid and of the general decline of metabolic activity which has always been accepted as a physiological accompaniment of aging. It is true that oxygen utilization is relatively low in older persons, but since this is true of aging in general, the basal metabolic standards should take advanced age into account, and a seemingly low metabolic rate should be properly allowed for. It is probably a serious error to conclude that thyroid medication is indicated. Clinical experience

shows that it is poorly tolerated and that the patient becomes restless and exhausted by significant dosage of thyroid. It may be concluded that lowered oxygen consumption in aging persons reflects, not a disease process, but the generally reduced activity of aging tissues; and it does not appear rational to attempt to accelerate this activity to a level appropriate to earlier life. If, however, a change can be brought about in the tissues themselves, so that their intrinsic metabolism becomes more vigorous, it is found that oxygen consumption automatically rises even without the use of thyroid. This rise, in aging men given testosterone, is only slight; but it will serve to demonstrate the thesis that non-specific stimulation of aging tissues beyond their capabilities is unnecessary as well as disturbing.

WE HAVE surveyed the recognized actions of hormones in the aging, and have emphasized that only one outstanding action is available therapeutically, namely, the protein-anabolic activity of testosterone and other steroids. We should emphasize, however, that this function is of real and practical significance, entirely exclusive of the hormonal effects on the target organs of the reproductive system, and that it is the first example that has appeared of a physiological intercession in the aging process.

VITAMIN B REQUIREMENTS

C. A. Mills, M.D.*

LAST YEAR Henry A. Rafsky, M.D., New York University Medical College and Bernard Newman, M.D., of the Hospital of Daughters of Jacob, New York City, described an apparent thiamine deficiency in aged people on diets which are qualitatively quite adequate for young adults. Low blood thiamine levels and low urinary output in elderly people on what was formerly considered an adequate thiamine intake, led these authors to conclude that diets for the aged need enrichment.

The increase in thiamine requirement (in mgm. per kgm. of food mixture) previously reported with advancing age in rats also seems to be verified.

None of the other B vitamins studied, such as choline, pyridoxine, riboflavin and pantothenic acid, gave any evidence of similar increase in requirement with advancing age. Dietary concentrations of the above remain similarly adequate throughout life in rats.

These findings in conjunction with the studies on old people, provide ample reason to recommend thiamine supplementation for elderly people.—

*B vitamin requirements with advancing age. Am J. Physiol 153: 31-34, 1948.

Prostatic Diseases in Old Men

Norris J. Heckel, M.D.*

RECENT STATISTICS show that life expectancy at birth has increased twenty-five years during the last century. At the present time it is about 65 years. Since many diseases of the prostate occur in elderly men, it is obvious that prostatic disease per capita has also increased.

BENIGN PROSTATIC HYPERTROPHY

One of the most common diseases of the prostate in old men is benign prostatic hypertrophy. Statistics reveal that from 55 to 65 per cent of men fifty-five years of age or over will develop some type of prostatic enlargement. In about 50 per cent of these, the obstruction will become so great that operative procedure will be necessary to relieve the patient of this condition.

It has not been too many years since the mortality rate from prostatic surgery was extremely high. At the present time, although more older men are being operated upon than previously, the mortality rate has been reduced to 1 to 2 per cent. The reasons for this spectacular reduction in mortality are: Better preoperative studies and preparation of the patient; better anesthetic agents and a more thorough knowledge of anesthesia; newer surgical methods and technique; new discoveries in antibiotics; and a broader understanding of the treatment of shock, including the judicious use of fluids and the replacement of blood loss.

In the preoperative management of old men suffering from bladder neck obstruction, the all-important factor is to place the individual in the best possible physical condition before any type of surgery is done. Decompression of the bladder and continuous drainage with the elimination of infection of the genito-urinary system; recognition of renal impairment, a frequent complication of bladder neck obstruction, and the improvement of this condition is necessary, as is also the recognition and improvement of the many associated pathologic changes in other parts of the body, such as coronary disease, cardiac insufficiency, malnutrition, blood dyscrasias, especially anemia; bronchiectasis, emphysema, and the elimination of all foci of infection. When all these pathological conditions are corrected, or improved to such a point that no further correction can be made, then and then only, is the patient ready to have the obstruction at the neck of the bladder removed.

THERE ARE four surgical procedures which may be employed: Suprapubic prostatectomy; perineal prostatectomy; retro-pubic prostatectomy; and transurethral resection of the prostate. Many factors must be considered before a

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decision is made as to which one of these methods is best for a particular patient. Likewise, the type of anesthetic to be given depends on many factors. In general, low spinal, sacral, and intravenous pentothal-sodium, supplemented in many cases by the various inhalation agents are to be preferred.

A GREAT change has taken place in the post-operative management of these patients in the past few years, the principal one being early ambulation. In the majority of patients, unless specifically contraindicated, the patient is placed out of bed on the following day. They are instructed to move their lower extremities or to walk. This early ambulation has apparently minimized the frequency of pulmonary emboli and thrombophlebitis.

HORMONE THERAPY

Recently enthusiastic results from the use of sex hormones in the treatment of benign prostatic hypertrophy have been reported. Although it has been adequately demonstrated that the estrogens produce extensive histological changes in the glandular structure of the prostate gland, yet, in our experience, we have not been impressed by the beneficial results from the use of this material in the treatment of patients with benign prostatic hypertrophy, as the urological surgeon recognizes it. Whether estrogenic therapy will offer relief to patients with so-called beginning prostatic enlargement is problematical. More clinical observations and reports are necessary before any clearcut statements can be made.

In a previous report, we have shown that the use of male sex hormone is of no value whatsoever in the treatment of this condition.

PROSTATIC CANCER

This is another common disease in old men. Recent statistics indicate that up to 15 per cent of men beyond the age of 60 develop prostatic carcinoma.

In the majority of patients the diagnosis is relatively easy to make. For instance, if a patient is beyond 55 years of age and comes to his physician with complaints of hematuria, difficulty of urination, backache and leg pains, and the rectal examination reveals a hard, infiltrated and nodular prostate, the most likely diagnosis is carcinoma. On the other hand, there are occasional instances in which the diagnosis is difficult to make and must depend upon a biopsy.

Many different forms of treatment have been advocated and intensive efforts have been made to treat this disease successfully. However, those who have observed a considerable number of patients with advanced carcinoma of the prostate have found little encouragement from any form of therapy. It is definitely agreed by urological surgeons that in early carcinoma of the prostate, that is, when the disease is confined within the limits of the gland itself, radical perineal prostatectomy is the proper procedure. Unfortunately, such a condition is found only in a minority of cases, not over 5 per cent, as compared with the group of patients in which the disease has extended

beyond the borders of the gland by the time the patient has presented himself to the physician for relief of his symptoms. The reason for this is quite obvious. Early carcinoma of the prostate, like carcinoma in many other organs is a silent disease. It is only when symptoms of urinary obstruction develop, or pain from mestastasis occur, that the patient seeks relief from his trouble. Because of this fact, it cannot be emphasized too frequently that every male patient, regardless of the symptoms for which he consults his physician, should have a rectal examination. If this is made a routine procedure, many more early cancers of the prostate will be recognized.

Of the many methods that have been used in the treatment of advanced prostatic carcinoma, the endocrine method is the most favorable. This was brought out by Huggins and his associates several years ago. In general the results of his investigations show that some types of prostatic cancer are extremely sensitive to androgens or the male sex hormone, and the presence of this material in the body activates the growth of cancer. In many patients, the inactivation of the male sex hormone brings about a retrogression of the cancer cells. This can be accomplished in two ways—by castration, or by the administration of estrogens. At the present time, there is some difference of opinion as to whether castration or the administration of estrogens will accomplish the same clinical response in patients with prostatic cancer. It is well established that in experimental animals, castration increases the gonadotropic activity of the anterior lobe of the pituitary, and it is known that the production of androgens is under the influence of this principle. Furthermore, it has been demonstrated that other organs besides the testes, notably the adrenals, are capable of producing androgens. Therefore, castration would not inactivate all the androgens, but might even increase the production of androgens in other organs. On the other hand, the administration of estrogens is believed to inactivate the production of androgens by depressing the gonadotropic activity of the pituitary. If this be true, then this form of therapy would be more likely to inactivate the production of androgens in all parts of the body. However, up to the present time, numerous clinical reports have failed to demonstrate definitely that the administration of estrogens produces a better response in the patient than castration. It will be interesting, after a longer time has elapsed, to compare the ultimate results of these two forms of therapy in prostatic cancer.

It has been our experience that estrogenic therapy is as beneficial, and the results as good, as those obtained by orchiectomy. In a previous communication, we reported fifty patients with advanced prostatic cancer who had been treated with diethylstilbestrol. The youngest was 52 years of age, and the oldest 81 years at the time they were first seen. No patient was included in the report who had not been observed for at least six months. Of the fifty patients, twenty-four were previously reported in 1944. At that time it was observed that six patients, or 25 per cent, died from the disease during the time they were under treatment; four patients, or 16.6 per cent,

were not improved; and fourteen patients, or 58.4 per cent, had been definitely benefited by this form of therapy; i.e., they had been relieved of their pain, their appetites improved, anemia disappeared, their weight increased, and all had the appearance of well-being and good health.

In analyzing the fifty patients as a group, we find that twenty-two are alive and enjoying good health, twenty are dead, and three are alive and suffering with the disease; three are alive and suffering with other diseases, and two cannot be traced. The term "good health" denotes the disappearance of pain, gain in weight, disappearance of anemia, increased appetite, and a general state of well-being. The prostate and the peri-prostatic extension of the cancer have become softer, and in many cases smaller. The histological changes that occurred in the prostate are very striking and pronounced. The alterations are characterized chiefly by extensive hydropic degeneration of the cancer cells. In this series there was no instance in which the metastasis to the bony structure had completely disappeared.

It has been our method to use 1 mg. of diethylstilbestrol three times a day by mouth, although in many patients much larger doses up to 25 mg. a day were given. The diagnosis of advanced prostatic cancer was made from rectal findings, X-ray findings of metastasis, and usually histological sections of the prostatic tissue which was obtained before estrogenic therapy was started. It should be recognized that it will do little good to castrate, or to prescribe estrogens to a patient with advanced prostatic cancer, and then let him die from renal insufficiency caused by chronic retention of urine from prostatic obstruction. It is quite obvious that the obstruction must be removed, and this can best be done, in most instances, by a transurethral resection.

UNTOWARD EFFECTS DURING TREATMENT

These were mild and of no importance compared to the clinical improvement that occurred. We had previously shown that, in the human, impotence, sterility, gynecomastia and complete disappearance of semen takes place during the administration of diethylstilbestrol. We have also observed increased pigmentation, especially of the nipples and on the ventral side of the penis. Occasionally leg cramps would occur. Although there have been isolated reports of liver damage from the use of large doses of this material, there was no evidence of this complication in this series of patients. There was one patient who developed severe gastrointestinal symptoms, characterized by diarrhea and pain, following the administration of 25 mg. of diethylstilbestrol a day, but these symptoms disappeared after the hormone was discontinued.

PRESENT STATUS OF ESTROGENIC THERAPY

When should estrogen therapy be started? How much should be given, and how long should it be continued? There is a difference of opinion regarding these questions, and at the present time they cannot be definitely

answered. It seems logical that treatment should begin as soon as the diagnosis of prostatic cancer is adequately established. Whether the patient with early prostatic cancer, in whom a radical perineal prostatectomy has been performed, should also be treated with estrogens is still an open question. Obviously, if the cancer has been completely removed, and no metastasis has occurred, the administration of estrogens would serve no purpose. However, there is no method at the present time, including the phosphatase test, that can accurately determine the presence or absence of early metastasis.

THE OPTIMUM dose of estrogenic hormone that should be given is not definitely known. At least 3 mg. of diethylstilbestrol a day has been advocated by some. It would appear that the amount to be used might depend upon the extent of the carcinoma. We have been of the opinion that much larger doses are more efficacious in the treatment of patients in whom the metastasis is extensive.

Also, it is not known how long treatment should be continued—possibly indefinitely—provided no serious reactions arise; even then it could be started again as soon as the welfare of the patient permits. However, the answer to these questions is still debatable. More time is necessary before a definite statement concerning the amount of the hormone, length of treatment, and proper time to begin treatment with this form of therapy can be made. There are many more questions that cannot be answered at the present time. For instance, is castration a better procedure than the administration of estrogens? Should castration be done and estrogens also be given? What are the therapeutic effects in relation to the grade or differentiation of the cancer? Further clinical observations will eventually give the answer to many of these important questions. At the present time it may be stated that patients with advanced prostatic cancer will live longer and more comfortably with this form of therapy, or orchiectomy, than all of the other methods of treatment that have been previously used in this condition.

INFECTIONS OF THE PROSTATE GLAND

Although several reports have been presented in the literature to the effect that hormonal therapy is efficacious in the treatment of prostatic infections, more well controlled observations are necessary before this form of treatment can be advocated in this disease. However, there are several well recognized diseases which many times are thought to be caused by inflammation of the prostate, in which estrogenic therapy is of distinct value, one being Hematospermia. This is characterized by bloody semen. Since most of the seminal fluid is made up of prostatic fluid, it is thought that the blood comes from the glandular portion of the prostate. We, as well as others, have found small amounts of diethylstilbestrol, 0.5 mg. to 1 mg. a day for five or six weeks to be very efficacious in the treatment of this condition.

These are the more common diseases of the prostate that develop in

elderly men. There are many others equally as important but rare in occurrence.

CONCLUSIONS

1. Benign prostatic hypertrophy, carcinoma of the prostate, and inflammation are the most common diseases of the prostate gland in elderly men.
2. Although more elderly men are being operated upon for the relief of bladder neck obstruction than in previous years, the mortality rate from surgery at the bladder neck has been spectacularly reduced until now it is 1 to 2 per cent.
3. At the present time, the only specific indication for hormones in the treatment of prostatic disease is in prostatic cancer.

TUBERCULOSIS IN THE AGED

F. J. Hebbert, M.D.*

PULMONARY TUBERCULOSIS in the aged is neither uncommon nor particularly benign; not infrequently patients in this age group are highly infective. Due to confusion with degenerative conditions leading directly or indirectly to like symptomatology, including cough, weakness, chest pain, dyspnea, hemoptysis, weight loss and hoarseness, such patients may fail to have their tuberculosis recognized until months or years after they have begun to produce sputum ladened with tubercle bacilli.

F. J. Hebbert, M.D., found that about one-half of the patients over 60 years of age discovered to have active tuberculosis at the University Medical Clinic, Stobhill Hospital, Glasgow, produced tubercle bacilli in the sputum as determined by examination of routine smears. The disease was fibroid in character in about 50 per cent of the cases examined radiologically and fibrocaseous in most of the remainder. Cough was almost invariably present, weight loss and dyspnea usually so, and hemoptysis was present in about one-third of the patients. Daily temperature rise was observed in only one-half of the patients and dyspnea in only about one out of six of these individuals. A history of pleurisy previously, or of treatment for tuberculosis, was obtained in 30 per cent of the patients in this series.

The sedimentation rate was by no means invariably elevated in the active cases of tuberculosis in this study. Since the red blood cells sediment more rapidly in old age than in youth, this test proved only of moderate diagnostic help. A normal-chromic anemia was quite frequently observed.

No treatment other than rest and symptomatic measures may be justified in such patients. They should be rendered harmless to others through isolation. This will protect infants and adolescent children in particular. Collapse therapy is seldom desirable. Occasionally surgical measures may be justified. Since fibroid cases may become active, routine periodical radiologic examination of established cases should be carried out.

*Pulmonary tuberculosis in the old. Lancet, 2: 247, 1948.

Quinidine in Geriatrics

S. A. Weisman, M.D.*

LIFE INSURANCE company underwriters and statisticians tell us that our population is growing older. In 1900 4.1 per cent or 3,000,000 of our population was sixty-five years or older; by 1940 the proportion had increased to 6.8 per cent or 9,000,000. It is estimated that by 1960 there will be a total of some 14,000,000 individuals sixty-five years of age or older.

The cause of death from heart disease in 1900 was at the rate of 137 per 100,000. In 1946 the death rate from heart disease rose to 307 per 100,000. There is reason to believe that as our population continues to grow older, the morbidity and mortality of heart disease will increase even more.

Much work is being carried out concerning the causes and prevention of heart disease; however until more is definitely known about the causes and prevention of this number one killer of our population, it behooves us to avail ourselves of every effective therapeutic measure that may be of value in the treatment of cardiac disorders.

Quinidine is not only a very valuable drug for the treatment of the acute arrhythmias in the young and with no underlying heart disease but is also a very effective drug for the treatment of cardiac disorders in the older age group. Since 1929 we have treated several hundred cardiac cases with quinidine. By far the majority of individuals treated were in the older age group.

BECAUSE of the rapid increase in our age population, the marked increase in the incidence of heart disease, and of our fairly long experience with the use of quinidine in the treatment of heart disorders in the older age group, a resume of our clinical experience may be of some value.[1]

INDICATIONS FOR THE USE OF QUINIDINE

Acute Arrhythmias

The value of quinidine in the treatment of the acute arrhythmias is fairly well established. One suggestion may be added. It need not be limited only to the younger individuals with acute arrhythmias and no underlying heart disease, as is generally advocated.

Extra Systoles

Extra systoles, particularly in the older age group, are often a complication of organic heart disease. This arrhythmia should be corrected because (1) extra systoles are the first signs of increased irritability of the heart and may be a forerunner for a more serious type of irregularity and (2) extra systoles are often annoying to the patient.

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QUINIDINE in doses of 0.1 gm. (1½ gr.) every two hours three or four times daily usually corrects this form of arrhythmia. When successful results are obtained and there is no more clinical evidence of extra systoles, it is advisable to continue the same sized dose twice daily for a period of ten days to two weeks, or even for longer periods.

Chronic Auricular Fibrillation

It is in the treatment of this form of arrhythmia that we have had our greatest experience. The only types of cases of chronic auricular fibrillation which we hesitate to treat with quinidine are those with very large hearts and especially those with mitral stenosis and large hearts. These types of cases are the most difficult to restore to normal rhythm, especially the latter, as once they are restored to normal rhythm, it is usually difficult to keep them regular for any reasonable length of time. Auricular fibrillation in the hypertensive and coronary sclerotic hearts seems the most receptive to successful treatment with quinidine.

Auricular fibrillation usually means cardiac decompensation.[2] There are those who claim that a slowly fibrillating heart is as efficient as a slow, regularly beating heart. Experimental and clinical studies have demonstrated that the efficiency of a fibrillating heart is 15 to 79 per cent[3,4,5,6] less than that of a heart after it has been restored to normal rhythm. We have had patients who had been adequately digitalized; the heart rates were slowed to 70 beats per minute, or thereabouts, yet they still were in cardiac failure. The restoration of regularity was soon followed by the disappearance of the signs and symptoms of heart failure. These patients, as a rule, were able to resume some form of useful vocation. My successes in regulating this form of arrhythmia have been about 65 per cent.

THE METHOD of treatment is important. We do not rely on the 3 gr. test dose that is almost always insisted upon when starting the use of quinidine. A patient may well be able to tolerate a 3 gr. dose without any ill effects but may experience very toxic symptoms if the second, third, and fourth doses are given in too rapid succession, or in too rapidly increased doses. In the treatment of chronic cases we see no reason for hurry. We have always adhered to the small dose method and in increasing the sizes and number of doses very slowly. By this method the patient rarely experiences the toxic symptoms so often attributed to the use of quinidine. The method too is very flexible. If any unpleasant symptoms appear as a result of the action of quinidine, the patient may go back a day or so on the schedule and proceed from there more slowly. With this procedure we rarely have to discontinue the use of quinidine because of toxic symptoms.

As additional precautions against emboli complications arising from the treatment of chronic auricular fibrillation, we have adopted the following procedure:

(1) Digitalize the patient. During this period give 0.1 gm. (1½ gr.) quinidine twice daily.[7]

(2) Heart rate must be decreased to between 80 and 70 beats per minute.

(3) Dicumarolize the patient until the prothrombin level is reduced to between 30 and 20 per cent of normal.[8]*

(4) After the heart rate has been reduced to between 80 and 70 beats per minute, and the prothrombin level has been reduced to between 30 and 20 per cent, keep the patient on maintenance doses of digitalis and dicumarol, and begin the administration of quinidine.

METHOD OF ADMINISTERING QUINIDINE

Day No.	8:00 a.m.	10:00 a.m.	12:00 noon	2:00 p.m.
1	0.1 gm. (1½ gr.)			
2	0.1	0.1		
3	0.1	0.1	0.1	
4	0.1	0.1	0.1	0.1
5	0.2 (3 gr.)	0.2	0.2	
6	0.2	0.2	0.2	0.2
7	0.33 (5 gr.)	0.33	0.33	
8	0.33	0.33	0.33	0.33
9	0.33	0.67 (10 gr.)	0.67	
10	0.67	0.67	0.67	

If the patient complains of any toxic symptoms, such as diarrhea, gastric distress, nausea, etc., reduce the dose to that of the previous day, for a few days, then proceed again as indicated.

If the heart has not returned to regular rhythm after giving 30 gr. of quinidine for a few days, discontinue its use. If it takes much more than 30 gr. to restore normal rhythm, it is very difficult to maintain a normal rhythm. After the heart is restored to normal rhythm, gradually reduce the dose of quinidine in amounts of 5 gr. daily until the patient takes about 15 gr. daily. The maintenance dose may be 10 gr. or even 5 gr. daily, in some cases. Usually 5 gr. for two doses two hours apart is the average maintenance dose. This dose may be kept up indefinitely together with digitalis. We have also kept some of our patients dicumarolized for periods up to twenty-one months.

*Our first series of cases that were given dicumarol were treated in the hospital. They may be treated ambulatory. Prothrombin time levels may be carried out in the office or any qualified laboratory.

COMPLICATIONS

We agree with other investigators[9,10,11,12,13,14] that the danger of formation of emboli following the restoration of normal rhythm by the use of quinidine is no greater than in those cases treated with digitalis, other cardiac drugs, or with no treatment whatsoever.

Instances of sudden deaths due to cardiac standstill and respiratory paralysis have been reported attributed to the action of quinidine. Auricular standstill and sudden deaths have been attributed to the use of digitalis.[15,16]

Acute Coronary Occlusion

The frequent cause of death following acute coronary occlusion is perhaps acute ventricular fibrillation. Experimentally it has been shown that the administration of quinidine following coronary occlusion lessens the incidence of ventricular fibrillation.[17,18,19,20] As a precautionary measure against this serious form of arrhythmia, we, as others,[21,22,23,24] deem it advisable to give quinidine particularly during the first week or two following the accident. Quinidine in doses of 0.1 gm. (1½ gr.) given two or three times daily is usually sufficient.

SUMMARY

(1) Heart disease is on the increase, and is the number one cause of death in this country.

(2) Since our population is growing older, a greater number of cardiac disorders can be expected.

(3) Until more is known about the causes and the prevention of heart disease, every available cardiac therapeutic measure of value must be used for the treatment of cardiac disorders.

(4) Quinidine is a valuable, effective drug for the treatment of cardiac irregularities, particularly in the older age group.

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AMERICAN GERIATRICS SOCIETY 1949 MEETING

THE 6th annual meeting of the American Geriatrics Society will be held in Atlantic City, New Jersey, Hotel Brighton, June 2-3-4, 1949.

The Carotid Sinus Syndrome

Elwyn Evans, M.D.*

DESPITE THE ANATOMIC and physicologic studies of Hering,[1,2] the clinical studies of Weiss and associates[3-5] and publications of many others,[6-34] carotid sinus syncope is still a perplexing problem.

Because of several interesting points, records of ten patients with probable carotid sinus syncope were reviewed. All had spontaneous spells of unconsciousness. Similar spells were reproduced in each by carotid sinus pressure and no other cause for the attacks could be found.

CASE REPORTS

CASE 1: Mrs. R. F., age 63, was first seen on June 2, 1938, because of metrorrhagia. Her heart fluttered and her head felt queer for the first time in 1937. Since then her heart has frequently been irregular and she has had spells of lightheadedness; occasionally unconsciousness. Her husband stated that her pulse was slow each time he checked it during attacks. During one spell it was regular at 52; twenty minutes later it was 82. Attacks were most likely to occur when she was fatigued and especially when anxious or worried. She was apt to have symptoms while hurrying to mail a package to her son overseas. She rarely had more than one spell of unconsciousness during one day, but syncope occurred several times the day her only daughter became engaged and when her husband was reported critically ill following surgery. She always had trouble when she hurried to close her house before going North each year and during periods when she had to attend social functions. She detested teas.

Physical examination revealed grade II medial sclerosis of the radial vessels and moderate dilation and sclerosis of the carotid sinuses, especially the right. Slight right carotid sinus pressure produced sudden slowing of the heart, pallor and unconsciousness on the two occasions it was tried. The blood pressure was 140/76. The remainder of the physical examination was noncontributory.

Electrocardiograms† showed frequent premature ventricular contractions. Fluoroscopy of the chest showed slight cardiac enlargement. Orthodiagraphic measurements were t/th=10.5/19.0 cm.

Phenobarbital and tincture of belladonna were prescribed but the latter was stopped because it repeatedly caused nausea. Quinidine sulphate grains III, t.i.d., not only reduced the number of ectopic beats but apparently the attacks as well.

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*Diplomate, American Board of Internal Medicine and Subspecialty Board of Cardiovascular Diseases; Fellow, American College of Physicians.

†All the laboratory tests done in each case are not included. Cases 5 and 10 are reported in more detail because of associated conditions.

CASE 2: M. B., age 50, was first seen on January 1, 1940, when he complained of dizzy spells for several months, particularly when he wore a tight collar, and one spell of unconsciousness. He had been under appreciable nervous strain. He had had financial losses and was not living with his family. He was slightly constipated, but had no other gastro-intestinal complaints. Unconsciousness and bradycardia were readily produced by pressure over the right carotid sinus which felt slightly dilated. The left was much less active.

Following explanation of the mechanism, avoidance of tight collars, rejoining his family and medication consisting of tincture of belladonna and ephedrine sulphate he got along so well that he soon stopped the medicine. He again began to have dizziness and occasional spells of syncope a couple of years later when two sons entered the service. He fainted three times the day a son was reported missing in action.

CASE 3: A. McG., age 77, was first seen in May, 1943, because of acute coronary insufficiency associated with temporarily inverted T-waves in lead 4F. He first complained of dizziness in December, 1944. Later he had spells of unconsciousness and carotid sinus syncope was diagnosed by a noted neurologist. Incidentally, he is the only patient in this series on whom I personally did not try carotid sinus pressure. One spell of unconsciousness occurred after a cocktail party which his wife gave and he detested. He had had no alcoholic drink. He stated, "Hurry and worry are the twins that bother me." He thought anxiety, fatigue and mental strain were contributory factors. Mild indigestion was the only gastro-intestinal complaint. Recently he had another attack of acute coronary insufficiency with temporary inversion of T-waves in leads V3 to 6 inclusive.

Physical examination revealed persistent bradycardia and some pre mature contractions. There was grade III radial sclerosis, moderate dilatation of the right carotid sinus and slight dilatation of the left. Fluoroscopy of the chest showed moderate dilatation and calcification of the aorta.

The blood cholesterol was 145 mg. per cent.

Ephedrine sulphate and pavatrine were effective in preventing attacks.

CASE 4: C. F., age 66, first consulted a physician in April, 1943, because of dizziness. The dizziness was recurrent and the patient fell on several occasions. The left arm and leg became paralyzed on December 4, 1943. Recovery was rapid and he felt well until June 4, 1945, when weakness and numbness of the left arm and leg and difficulty in speaking were noted. The symptoms again disappeared rapidly. On May 4, 1946, he had a transient spell of unconsciousness. No gastrointestinal symptoms other than excess gas and vague indigestion were elicited.

This patient stated that he was not nervous, fatigued or worried, but he was working long hours under strain during the war and until his retirement in 1946. Since then he has had no more symptoms.

Physical examination when first seen on December 28, 1943, revealed an elderly male with left hemiparesis. The blood pressure was 146/68. Radial

vessels showed grade III sclerosis. The right carotid artery was moderately dilated and somewhat sclerotic and pressure upon it readily produced asystole and unconsciousness. The remainder of the examination was noncontributory.

Tincture of belladonna and phenobarbital were taken for a short time.

CASE 5: W. H. McN., age 50, was first seen on July 7, 1945, when he gave a history of syncope on October 21, 1944, and several spells when he felt as if he were going to faint. Numbness and coldness of his right arm and inability to hold a cup were bothersome. He gave a history of having been unconscious for a few seconds three years previously following a blow on the head and of sleeping with his right arm above his head. The patient himself noticed that spells were precipitated by nervous or emotional strain. He was doing work he disliked and it frequently irritated him. Several previous serious diagnoses of different kinds aggravated his symptoms.

Physical examination revealed moderate dilatation and sclerosis of the right carotid sinus and slight dilatation of the left. Bradycardia and unconsciousness were easily produced by pressure over the right carotid sinus but not the left. The right hand grip was weak and superficial sensation to pin prick was impaired over the dorsum of the fourth and fifth fingers and the anterolateral aspect of the forearm. Abduction of the right arm obliterated the radial pulse and aggravated the arm symptoms. The physical examination was not contributory otherwise except for a spastic descending colon.

The blood cholesterol was 298 mg. per cent; the B.M.R. —15.

The electrocardiogram showed premature ventricular contractions and a bradycardia of 60. X-rays of the skull, chest and cervical and dorsal spine were negative. The blood count, serology, brucella agglutination test, sedimentation rate, glucose tolerance test, spinal fluid, serum calcium, blood chlorides and urinalysis were normal.

The arm symptoms disappeared in two weeks when his wife cured him of the habit of sleeping with his arm abducted—she sat up nights and every time he put his arm up she pulled it down. Other symptoms improved after reassurance, explanation* of the various mechanisms, phenobarbital and tincture belladonna. Medication was only taken for a short time, but he had no symptoms for nearly two years when he began to have them again after the belongings of son killed in action were sent to him. At this time syncope was produced by right carotid sinus pressure without appreciable slowing of the pulse or fall in blood pressure.

Three and one-half years later, carotid sinus pressure was again followed by bradycardia and syncope. He then commented on the exhaustion which followed the induced attacks and spontaneous spells of lightheadedness. He also mentioned having substernal pain on exertion which radiated down his left arm. Hyperabduction of the arm again caused tingling and

*Explanation of their attacks and reassurance was part of the treatment for all patients.

numbness but the pulse was not completely obliterated. Oscillometer tests showed marked reduction in arm circulation in hyperabduction, the decrease appearing with the arm abducted 45 degrees and increasing as the arm was abducted to 180 degrees.

CASE 6: J. B. R., age 66, was first seen on September 14, 1945, because of spells of unconsciousness, fatigue and gas. His first attack of syncope occurred three years previously while shaving, the second while helping his wife repair a chair and the third while driving late at night after a hard day of work. He was under tension each time. Other symptoms were epigastric burning and gnawing during and immediately after eating and buzzing in the ears.

Physical examination revealed grade II radial sclerosis. Blood pressure in the left arm (sitting) was 160/82; right arm (lying) 164/86, (sitting) 170/86, (standing) 160/82. There was persistent bradycardia and an occasional premature ventricular contraction. The carotid sinuses were moderately dilated and sclerotic, especially the right. Very slight right carotid sinus pressure immediately produced asystole and unconsciousness. Other abnormal findings were slight impairment of hearing and early cataracts.

The B.M.R. was —14; the blood cholesterol 318 mg. per cent. Gallbladder and gastro-intestinal X-rays were negative. Orthodiagraphic measurements were t/th=14.5/26.5 cm.

He got along well after belladonna and phenobarbital were started except for one attack of Paroxysmal tachycardia on November 18, 1947. At this time considerable carotid sinus pressure was necessary to produce unconsciousness.

CASE 7: R. C. H., age 43, first seen on April 5, 1947, gave a history of having had spells of unconsciousness seven years previously. He was definitely worse after being told he had coronary thrombosis. After diagnosis of carotid sinus syncope at Johns Hopkins Hospital, reassurance and medication he had no more trouble until a few weeks ago when he began to have spells similar to those he had had seven years previously. He was under considerable anxiety because he had recently been promoted to a job of responsibility and work with which he was not familiar.

On physical examination he was found to be somewhat obese and nervous. Xanthalasma was noted. Asystole and syncope were readily produced by right carotid sinus pressure. The left carotid sinus was less active although it was the more active seven years previously. The heart was slightly enlarged but did not appear abnormal otherwise. Orthodiagraphic measurements were t/th=14/26. The blood cholesterol was 220 mg. per cent and B.M.R. plus 15.

He took tr. belladonna and phenobarbital for only a short time but has had no further trouble. He now enjoys his work and the anxiety has disappeared.

CASE 8: P. N. D., a 53-year-old physician was seen on December 2, 1947, because of exertional dyspnea and angina pectoris since the first of three attacks of coronary thrombosis three years previously. He became unconscious during two of the attacks. He had many spells of dizziness, especially when parking his car and particularly when wearing his army shirt. He had gained weight after discharge from the army. Things frequently appeared unreal, small and far away during anginal pain. He was under nervous strain professionally and otherwise.

On physical examination the carotid sinuses were found to be moderately dilated and sclerotic, the right more than the left. Pressure over either quickly produced asystole, pallor and unconsciousness, but the right was the more active. No other significant physical findings were noted. The electrocardiogram showed right bundle branch block and the blood cholesterol was 220 mg. per cent.

Treatment, except for avoidance of a tight collar, has not been very helpful. The aggravating emotional factors have persisted however.

On August 31, 1948, substernal chest pain was recurrent for a couple hours. During this time he tended to "black out" and had a sensation of numbness, pain and tingling in the left side of his face and neck and the ulnar aspect of his left arm. The left ring and little fingers became flexed and stiff. After considerable medication he slept for 14 hours. The face and neck symptoms persisted for two days, but the arm and hand symptoms had not completely disappeared eight days later. There was no definite evidence of myocardial infarction.

CASE 9: W. K., age 52, was first seen on March 26, 1948, because of chest pain. He gave a history of having had two spells of unconsciousness three and four years previously while hurrying to airplane accidents. His blood pressure was found to be elevated in June, 1944, and carotid sinus hypersensitivity was diagnosed in an army hospital in 1945. He frequently had dizzy spells when worried, nervous, wearing a tight collar or turning his head quickly.

Physical examination revealed icthiosis. The blood pressure in the right arm (lying) was 158/100; left arm (lying) 160/100, (sitting) 154/98. Dental hygiene was poor. There were grade II changes in the radial vessels and grade II arteriolar sclerosis (A-V nicking) of retinal vessels. The heart was borderline in size. There was a grade I apical systolic murmur. The carotid sinuses were slightly dilated and sclerotic, especially the right, and pressure over the right produced syncope.

The blood cholesterol was 358 mg. per cent and the B.M.R. —3.

Less dizziness was noted after medication was started.

CASE 10: G. B., age 52, on May 29, 1948, gave a history of having had several spells of unconsciousness and many spells of lightheadedness and vertigo since February, 1948. The first attack began with pain in the left

precordium followed by vertigo and later unconsciousness. He had had mild pain in the epigastrium and the left precordium, but the lightheadedness and unsteadiness were the most bothersome. He stated that he did not feel worried, nervous or fatigued although he had been working very long hours, frequently 16 or more daily. His symptoms were definitely worse when his daughter fractured her leg.

The patient was quite obese. The right carotid sinus was moderately dilated and sclerotic and pressure over it immediately produced asystole, pallor and syncope. Heart sounds were only of fair quality but the physical examination was not unusual otherwise.

The electrocardiogram showed left bundle branch block. The blood cholesterol was 217 mg. per cent and the B.M.R. —2.

Treatment with tincture of belladonna and phenobarbital was unsatisfactory and poorly followed.

Surgery was performed elsewhere on July 20, 1948, for an acoustic nerve pontine angle neuroma or Ménierès disease. No tumor was found, so the vestibular portion of the eighth nerve was severed. The severe vertigo disappeared but there was some residual unsteadiness. Lightheadedness followed by fatigue soon recurred and within two months spells of unconsciousness, associated for the first time with convulsive seizures, appeared. The convulsive seizure started with jerking of the left arm and shoulder and was associated with an imperceptible pulse. When seen on September 9, 1948, asystole, pallor and unconsciousness were immediately produced by pressure on the right carotid sinus. These were soon followed by jerking of the left arm and shoulder but the pressure was not maintained long enough to produce generalized convulsions. The diagnosis was further confirmed when surgery on the carotid sinus four days ago completely relieved the symptoms.[35]

SUMMARY

Of ten patients with probable carotid sinus syndrome, all had spontaneous syncope as well as vertigo, lightheadedness or staggering. Similar attacks could be reproduced in each by carotid sinus pressure and no other cause for the spells could be found.

Nine were males. Ages ranged from 43 to 77 years, averaging 57.5 years.

All showed vagal or cardio-inhibitory response during induced attacks. One showed vagal response on one occasion, apparently the cerebral form two years later, and vagal response three years later.

All appeared to have some carotid sinus dilatation—the right more than the left. Eight showed some sclerosis of the sinus. The right sinus was the more sensitive in the five cases in which bilateral sensitivity was checked. Eight had cardiovascular signs or symptoms otherwise, including bradycardia, paroxysmal tachycardia, bothersome ectopic ventricular contractions, arteriosclerosis, atherosclerosis, arteriolar sclerosis, essential hypertension, temporary spontaneous hemiplegia, angina pectoris, acute coronary insufficiency,

myocardial infarction and right and left bundle branch block. Four of these had coronary heart disease.

In the patient who had bothersome premature ventricular contractions and was allergic to belladonna, quinidine appeared to reduce the number of attacks as well as ectopic beats.

No important gastro-intestinal pathology was found; however, one patient had nervous indigestion off and on for years and three had evidence of spastic colons.

Four patients complained of fatigue; two stated that they noticed it most after spells of lightheadedness, and two felt exhausted after induced attacks. Three of the four had definite coronary heart disease.

The "neurovascular syndrome" and Ménierès disease complicated the picture in two cases.

Syncope was most likely to occur in all patients during periods of fatigue, anxiety or hurry. Three were definitely made worse by previous serious diagnoses.

Of the six patients in whom the blood cholesterol and basal metabolism were checked, the blood cholesterol was elevated in all (over 300 in three) and the basal metabolism was slightly elevated in one, slightly lowered in three and normal in two. The blood cholesterol level of the oldest patient was 145 mg. per cent; the metabolism was not checked in this case.

Treatment not only consisted of medication such as atropine or belladonna, ephedrine and phenobarbital, but explanation of the attacks, reassurance and avoidance of undue fatigue, hurry and nervous or emotional strain when possible.

DISCUSSION

Because of several reports of unfavorable responses following carotid sinus pressure,[16,25,28,31,34,36] syncope was not often reproduced more than twice in each patient although it would have been desirable for further study in some instances. Askey[31] described seven cases of hemiplegia which occurred immediately after carotid sinus stimulation reported by himself and members of the California Heart Association. It is possible that the two spells of temporary spontaneous hemiplegia in case 4 of the present series were secondary to spontaneous carotid sinus activity.

The right arm and hand symptoms in case 5 were thought to be on the basis of the neurovascular syndrome[42,43,44] rather than carotid sinus sensitivity because they were aggravated by abduction of the arm which obliterated the radial pulse and relieved by adduction and because the right carotid sinus was the hypersensitive one. Untoward unilateral reactions to carotid sinus stimulation have been contralateral.[5,16,31,36] The numbness and tingling of the left side of the face, neck and left arm which were somewhat persistent and the spasmodic contractions of the left ring and little finger in case 8 were thought to be on the basis of carotid sinus hypersensitivity because the right

sinus was the most active and coronary insufficiency would not explain the motor symptoms.

Case 10 is an interesting one in that some of his symptoms were apparently caused by Ménierès disease. The pronounced vertigo was relieved elsewhere by section of the vestibular division of the eighth nerve. Spells of unconsciousness, an important point in the history, could not be explained on basis of Ménierès disease and the impression that something else, probably hypersensitive carotid sinus, was at fault was soon confirmed. Diagnosis was further substantiated when carotid sinus surgery relieved the symptoms. It is possible, however, that section of the vestibular portion of the eighth nerve did not relieve Ménierès symptoms, per se, but relieved vestibular symptoms associated with carotid sinus hypersensitivity. Vertigo as well as lightheadedness or unsteadiness has frequently been described in patients with carotid sinus syncope.

Mixed forms have been recognized since the early reports of Weiss and associates.[3,4] Galston et al[25] found that two or more types usually occurred simultaneously. During induced attacks, case 5 in the present series showed predominantly vagal response on one occasion, predominantly the cerebral form two years later and the vagal type three years later. The remaining nine cases were of the vagal type; at least, they showed vagal response during induced attacks.

Emotional upsets, worry and neurotic states in the cerebral type were stressed by Weiss and associates.[3,4,5] Purks[27] stated that emotional tension was known to increase reflex irritability. Needles[19] in discussing treatment mentioned that fatigue, emotional upsets and worry should be eliminated when possible. Bronson and Stuart[20] observed a high incidence of associated disorders including emotional instability. Vagal hypertonicity and tension states are frequently associated in gastro-intestinal disorders and relief of either by antispasmodics (such as atropine), sedatives and psychotherapy is helpful in treatment. Therefore, it is not surprising to see such a close relationship between tension states, vagal hypertonicity and the vagal type of carotid sinus syncope as well as between tension states and the cerebral type.

IT IS POSSIBLE that quinidine sulphate reduced carotid sinus symptoms in case 1 indirectly by reducing nervous tension through reduction of ectopic beats. One frequently sees nervousness increased by ectopic beats as well as ectopic beats increased by nervousness. A corollary is also frequently seen when ectopic beats decrease as nervousness subsides and vice versa. Another possibility is that the frequent forceful beats following the compensatory pause after premature ventricular contractions irritated the sinus and reduction of these by quinidine helped reduce carotid sinus irritability.

A high incidence of associated cardiovascular disorders has been noted previously.[5,20,24,30] Arteriosclerosis is prevalent in the upper age groups and carotid sinus sensitivity predominantly occurs in the upper age brackets. Other cardiovascular defects are frequent in the younger patients. The two

spells of unconsciousness during two of three attacks of coronary thrombosis in case 8 could have been related to carotid sinus sensitivity.

Changes in the wall of the sinus itself may play a part in the picture because the sinus appeared somewhat dilated in all ten cases. The right was more dilated than the left and was the more sensitive in the five patients in whom sensitivity of both sinuses was checked. Dilatation has been observed by others. In eight of the ten cases there also appeared to be varying degrees of sclerosis of the sinus.

In recent years, there has been growing interest in the relationship between cholesterol metabolism, thyroid activity and vascular disease.[37-41] Blood cholesterol levels and metabolic rates were frequently determined in this series because of their possible roles in arterial disease generally and in carotid sinus sensitivity specifically. There was no positive correlation between the basal metabolism and carotid sinus syncope; however, there appeared to be a positive correlation between hypercholesterolemia and increased carotid sinus sensitivity, especially in the younger patients. Blood cholesterol levels were increased in six of the seven patients in whom it was checked. The one patient in whom it was not elevated was the oldest patient who was 77 years of age. Morrison et al[38] found hypercholesterolemia in 68 per cent of patients under 60 years of age with coronary thrombosis and 48 per cent of patients over 60.

CONCLUSIONS

1. The carotid sinus syndrome is primarily a disease of males in the upper age brackets.
2. Fatigue and emotional states are important in the vagal as well as the cerebral type and may account, at least in part, for spontaneous variations in carotid sinus sensitivity.
3. Psychotherapy is an important part of management.
4. Other cardiovascular diseases are usually present.
5. It is probable that pathological changes in the wall of the sinus itself play a part in the picture.
6. Associated abnormalities, such as Ménierès Disease and the cardiovascular syndrome in this series, may make the diagnosis appear more difficult or appear more serious.
7. Quinidine may reduce the number of seizures when ectopic beats are bothersome.
8. More than one type of carotid sinus syncope may not only coexist but one form may predominate at one time and another at another time.

The author wishes to thank Dr. LeRoy Sutter for his permission to present Case No. 10 in this study.

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"CORONARY" DISEASE OF THE HIP

THE CIRCULATION of the head and neck of the femur is limited and is not unlike the coronary circulation of the heart. Impairment of this circulation by vascular disease, trauma, or emboli results in degenerative changes which too frequently are irreversible, leaving permanent progressive pathologic alterations impairing joint function. Except for the character of the tissue involved, this degeneration is not dissimilar to that found in the myocardium. The disabling sequelae following fractures of the neck of the femur may be attributed to an inadequate blood supply, bone repair is inadequate to restore the normal function of weight bearing.

The acute insult of fracture or dislocation of the hip or the insidious degeneration accompanying local or general vascular disease of this structure results in progressive alteration of bone structure rendering it incapable of normal function. The relation of age to this picture is quite obvious. Hence the justification of the term "coronary" disease of the hip.—Fremont A. Chandler, M.D.

Should the Elderly Cancer Patient Be Told?

Raphael Ginzberg, M.D.

THE QUESTION whether the patient with cancer should be told the truth about his condition is an old one, and the question is answered as frequently with a "yes" as with a "no." The modern view that the relationship between doctor and patient should be based on complete truthfulness, and that the patient must be psychologically prepared to face reality and assume responsibility for himself, favors the affirmative answer. Moreover, it is felt that the truth will percolate through even the most skilfully diplomatic attitude of a doctor and eventually create an atmosphere of anything but confidence between doctor and patient.

Dr. Richard C. Cabot has been unequivocal in defending truthfulness as the basis of relationships among human beings and especially among doctors and their patients. In his "The Meaning of Right and Wrong" (The McMillan Company, New York, 1933) he wrote: "It appears to me that the doctrine that it is sometimes right to lie can never be effectively asserted." (p. 167.) "So far as I see . . . the conscientious defense of lying is impossible." (p. 168.) "Benevolent medical lies, told to spare the patient's feelings and so to conserve his strength are the common form of unavowed despotism." (p. 313.) Dr. Cabot's answer to the question would seem to be so clear-cut as not to require further clarification.

Yet, in dealing with the problem presented here, even he apparently entertains some doubt. Ernest H. Daland, in his recent article, "Palliative Treatment of the Patient with Advanced Cancer" (JAMA, vol. 136, No. 6, Feb. 7, 1948, p. 391), which discusses the question whether a patient with advanced cancer should have the truth disclosed to him, quotes Dr. Cabot as saying, in modification of his original point of view: "Certainly, I never said that you had to tell them the *whole* truth." Daland himself never tells a patient that his condition is hopeless. He feels that no patient with cancer gives up hope so long as his physician does not yield.

Cancer is predominantly a disease affecting aged and aging persons. A diagnosis of cancer, and especially of inoperable cancer, is a death sentence. A death sentence, with no chance of pardon, casts a very specific hue over one's life. Cancer in an advanced stage is a pitiless disease. It destroys all hope and has a deep psychological influence on both the patient and his environment.

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THE BASIS of the psychology of an individual is interchange of events and experience. There are ups and downs, successes and failures, hopes and disappointments, health and disease—with death somewhere in a nebulous future. There is always, if not the possibility, at least the hope, of a change. When, however, an individual must face the fact that death in the near future is inevitable, an entirely new picture emerges. The usual dynamism of interchange is superseded by a static factor of great potential strength. The expectancy of death, without counterbalancing hope, becomes predominant. This dominant factor does not, however, entirely suppress other psychological reactions. The outer manifestations of expectancy of death varies, therefore, in accordance with individual psychological mechanisms. An elderly neurotic reacts in one way; a non-neurotic, or so-called normal, patient, in another. Independently, however, of whether the patient is well balanced or not, death has in general a different significance for persons in advanced life than for those of younger age. The closer to senescence and the farther from adolescence, the more real, more grounded, and less neurotic does fear of death become. In younger patients, even among those hopelessly ill, death continues to be potentially remote. In elderly patients, even among those who are well, death is potentially around the corner. The sick elderly person who knows that his condition is hopeless is therefore more profoundly disturbed. His hopelessness is more firmly fixed than in the younger patient, and the psychological reaction to pain, weakness, and other organic changes is much more outspoken. Exhaustion and pain especially are constant reminders that there is no way back to life.

Environment is often an aggravating factor in the psychological condition of dying elderly patients. Often the patient, even prior to the occurrence of the actual disease, has suffered from the feeling that he is unwanted, that there is no room for him, and that no one sympathizes with his suffering. This and other extrinsic factors deepen the sense of hopelessness, increase confusion, and lessen the resistance of the desperate patient.

IT IS PARADOXICAL that the less able such an elderly person is to reconcile himself to reality, the less satisfied he is, the stronger is his conscious attachment to life. More often, perhaps, than we believe, the thought of preservation of life itself represents the entire content of the thinking of such a person. Little imagination is required to understand how such a patient will react to the disclosure of the fact that he is hopelessly ill. We can foresee that in the great majority of cases the very idea that an illness may mean cancer will be a psychological catastrophe.

This happened to Mr. B. (case 1) whom I first saw on July 24, 1945, and last saw on October 18, 1945. For the past fifteen years he had been living in retirement in Florida. In the winter of 1944-45 he had suffered two attacks of pneumonia and eventually developed hoarseness. He went for diagnosis and possible treatment to a diagnostic institution well known both here and abroad. The diagnosis was easily made, and Mr. B. was truthfully informed

that the cause of his hoarseness was an inoperable bronchial cancer. According to the information I received from both the patient and his wife, the doctor had apparently been sympathetic. But the patient reacted with a deep despair, and was from then on a completely broken man psychologically.

Physically he was by no means in bad shape. Occasionally he would run a slight temperature and once or twice during the three months he was under my care he suffered an attack of hemoptysis. He was, however, able to take walks, occasionally take his meals in restaurants, and receive friends and relatives.

His environment, however, contributed much to his hopelessness. On my visits to the patient I always found an atmosphere of gloom and despair. A crowd of relatives, friends, and neighbors whispered mysteriously, often sitting around in the living room next to patient's bedroom. The patient spent most of his time in isolation. His wife (it was patient's second marriage), who was younger than he (she was 59 years old) demonstrated her sorrow verbally, but was much more concerned with her own health than with her husband's, and anxious to know what her husband and I talked about during her absence.

After three months the patient felt rather better subjectively. He took his medicine and accepted injections; his blood count improved from 69 per cent H.B. and 3,420,000 RBC to 76 per cent and 4,260,000, respectively; the white count showed only a slight shift to the left. But it was not possible to establish any real contact with him. He showed no interest in anything, not even in the findings. Expecting no cure by an ordinary doctor, he went for treatments to a quack who is always readily found in such circumstances. He discontinued this treatment, however, and returned to Florida, where, I learned, he died some months later.

The disclosure of the truth did not increase Mr. B's confidence in either doctors or medicine. The honesty of the doctor only aggravated his psychological condition. The last months of his life were months of deep depression devoid of any ray of hope.

ANOTHER patient had a similar experience, but this case had a happy ending. Mrs. W. (case 2), 62 years old, had been suffering since August, 1946, from recurrent back pain with sciatica. In September, 1947, a mass at the right side of the abdomen was noticed and a complete work-up suggested. She was referred to one of the best known diagnostic services of this city where, from September 17th to October 28th, 1947, she underwent a thorough examination. At one point prior to the diagnosis one of the examining doctors in a conversation with the patient admitted to the patient that it was "quite possible" the cause of her disease was cancer. The patient reacted violently, the family was deeply upset, and an atmosphere of psychological catastrophe was created. There was, however, no carcinoma. A large infected hydronephrosis was discovered, an operation performed and the right kidney removed. The patient is now well although she still suffers some back pain.

The purpose in describing this case was to show that doctors sometimes talk easily about carcinoma. It is obvious there was no necessity for telling the patient that she might have a cancer. The doctor in this case did not give proper consideration to the possibility of disastrous psychological reactions.

MRS. L. (case 3), 65 years old, came to me for treatment of a cold because she had been coughing for several weeks. Her son had previously informed me that his mother planned to visit me, and expressed his opinion that his mother was nervous and really needed psychiatric care. She had always been a neurotic person.

I saw the patient first on October 18, 1947. She was pale, undernourished, short of breath, coughed constantly, and complained of chest pain.

Her "cold" soon proved to be widespread lung metastases which were apparently progressing along the lymphatics. The patient passed away six weeks later.

And now her past history (I omit details). Some four or five months prior to her first call at my office patient had been operated upon for a rectum carcinoma. On her insistence, the surgeon had told her the truth (he confirmed this to me). This intelligent patient was, however, now unable to recall the name of her illness, nor did she show that she was aware of the nature of her ailment. A thorough psychiatric and neurological examination did not reveal the presence of any other memory or psychic disturbance. The isolated memory defect was definitely of psychological origin.

I had a number of sessions with the patient. We had long talks about her condition, her past, and the possibility of recovery. She mentioned once or twice that she must know the truth about her chest condition, but did not insist too much. Though difficulties in bowel movement and other abdominal symptoms reminded her of her operation and the disease, which she was aware of, the words "malignancy," "carcinoma," or "cancer" never once appeared in her vocabulary.

In this case the truth apparently did the patient neither good nor harm. This neurotic person plainly suppressed the actuality.

MRS. M. B. (case 4), 55 years old, a patient of mine since October 10, 1943, had been reluctant to consult a doctor. It was difficult to obtain an exact history from this woman. The information she gave was indefinite and sounded slightly mysterious. She had been taking digitaline Nativelle from time to time and felt that this was the right medication for her heart. Questions connected with possible climacteric symptoms she led gently away from, implying that she was under care of a gynecologist. She denied staining or discharge. Later I saw her and her husband several times for minor illnesses; we were on friendly terms. I succeeded in convincing her that she had no heart condition or other organic disease as far as my domain was concerned. Though there was no indication that she might be suffering from any organic gynecological condition, I repeatedly insisted on the necessity of having the

opinion of a gynecologist with whom I could consult. I never succeeded, however.

I wondered how this intelligent, though neurotic, woman could become concerned about a slight cold, worried about minor illnesses of her husband, and highly upset about any malaise in her cat, but was evasive when the question of the necessity of a gynecological examination was brought up—a necessity that she obviously realized.

On January 15, 1945, I received an emergency call from her excited husband. The patient was bleeding. It was a malignancy. Four days later she was operated upon. An inoperable corpus uteri carcinoma was found. After a temporary improvement, a long period of suffering began and the patient expired on March 3, 1946.

What did this patient know about the nature of her disease? There had never been much talk between us concerning her real condition. It had been tacitly agreed that there was no malignancy. The patient was cooperative throughout the entire period of her illness. She was interested in her hemoglobin counts, in her urinalyses, and the other tests. She received several blood transfusions and vitamin and liver parenterally; vitamin, iron, pepsin, pancreatin orally. Several episodes of severe and painful cystopyelitis were improved by penicillin. She was truthfully informed of everything except the malignancy.

After several months I began to believe that the patient was not aware of the real nature of her illness. Once, to my astonishment, she asked me whether I thought her *cancer* could be cured. I am positive that she used the word "cancer." Before I had time to say anything, however, she corrected herself and tried to convey the impression there had been a slip of the tongue.

There was no change in her attitude following this incident. She continued her acting. This patient knew that she had a cancer but was anxious not to have her physician confirm this. She was afraid to hear the truth uttered. This self-deception was her particular neurotic reaction. With the help of these neurotic mechanisms she managed to endure the suffering of the last months of her life calmly and without losing her self-control.

COMMENT

In the four cases cited, each of the patients reacted differently to the truth. In the first case, knowledge of the truth brought the patient no relief at all. He became discouraged and desperate, and his resistance was obviously lowered. In the second case, the patient's violent reaction to the disclosure she might have a cancer was overcome because eventually another diagnosis was made. In the third case there was no apparent reaction to the truth. Since the habitual reaction of this patient was to suppress any implications of a serious or dangerous condition, she adapted herself to the truth in her usual way without any visible psychological disturbance. In the fourth case the patient had been deceiving herself all through her life, as much before she

became ill as after. She knew the truth but lived in an imaginary world of self-deception. Neither her knowledge of the truth nor of the fact that her doctor was practically lying to her (and I agree with Dr. Cabot that there is no difference between half a lie, a lie by implication, and a whole lie) had had any apparent influence on her state of mind during the agonizing months of her illness.

THE QUESTION whether one should or should not reveal the truth to the elderly patient suffering from cancer cannot and must not be answered with a plain "yes" or "no." The answer must be a different one in different cases and must take into consideration the patient's personality, the environmental factors that affect him, and the character of the patient's relationship with the doctor.

It is the physician's task to guide a dying patient through the physical and psychological difficulties of his last months and days. The conception that a lie can under no circumstances be justified creates peculiar conditions. There are, for example, patients who do not expect or are afraid to learn the truth. Should we tell them the truth nevertheless?

We cannot come with a rigid conception, with yes or no answers, and expect that no friction will occur. If our moral discipline is in conflict with the psychological condition of the elderly which has been described here, then there is something wrong with our conception. We cannot blame facts if they cannot be adapted to our philosophy. We have no right to any preconceived attitudes towards our patients. A patient who pleads to be told the truth may actually want to be deceived; another may ask for poison with which to commit suicide, yet not expect the doctor to give him any. Or we may act in the conviction that the truth is expected and soon find that we have been mistaken. Daland (ibid., p. 392) mentions a case which illustrates such a situation. He writes: "I do not advocate going out of one's way to deliberately tell a man that death is around the corner. I did that once with a Catholic clergyman who had failed to do well after several operations, as I thought he might wish to prepare for death. He was amazed at the statement and was unwilling to believe it."

The exterior of a suffering and dying patient is deceiving. Of course there are some patients who are able to face reality, even death. I know that there are some among our elderly patients who prefer to know the pitiless truth rather than be treated as immature and irresponsible individuals. To such persons we may tell the truth. We must, however, achieve a genuine psychological contact with them before we make up our minds that they can stand being told the truth.

In cases where the doctor's time is limited, or where he does not know his patient well enough, I would suggest—and this is the only exception I make to my advice that no rigid rule be followed—that the patient not be told the truth. Under such circumstances the lie will be less harmful to the patient than the truth.

THERE IS another point. Modern geriatrics offers new means of symptomatic therapy. Some of the symptoms of elderly patients suffering from carcinoma can be attributed to deficiencies, lack of digestive enzymes, disturbed nitrogen balance, gastrointestinal disturbances, which can be corrected to a certain degree. The new physiological approach to geriatric problems may often lead to temporary improvement and thus restore to some extent the disturbed dynamism of the patient's psychology and the atmosphere of interchangeability in which hopes and disappointments again follow in succession.

I RAISE THIS old and ever new question again because I feel that there is a strong tendency toward disclosing the truth to the hopelessly sick patient under non-psychological conditions. If this were not so, I do not believe that I could have selected from among my elderly patients over a relatively short period (1945-47) as many as three persons to whom the truth of a cancer diagnosis was disclosed under anything but psychological circumstances. Two of these three patients had been examined in widely recognized diagnostic and therapeutic institutions. In one case (case 2) it is almost incomprehensible that the patient should have been told she might be suffering from a malignancy when she was not.

Since the maintenance of psychological equilibrium in the elderly hopelessly sick patient is a problem of utmost importance, and since this problem has been far from satisfactorily solved, as I have tried to show, I feel that it is time to enter into a new discussion of the question. I feel that an exchange of experience in different fields of medicine is necessary to elucidate it. Modern psychology and modern geriatrics have a contribution to make to a new approach which shall be adequate for our times.

SUMMARY

1. Whether it is right or wrong to tell the elderly patient suffering from carcinoma the truth has been discussed from several angles.
2. The opinion has been expressed that there is a strong tendency to tell the truth under any circumstances.
3. It has been shown that the problem is primarily a psychological one. The decision what to tell the patient must be made in each case in accordance with psychological and environmental conditions. To adhere rigidly to either a yes or no attitude may result in harmful effects for the patient.
4. The opinion has been expressed that up to the present time the question has not been solved satisfactorily. Discussion and an exchange of experience of different branches of medicine and psychology have been advocated.

Neurological Disorders in Later Life

Lewis J. Pollock, M.D.*

MANY NEUROLOGICAL disorders may be found in the later part of life; few are peculiar to it. Arteriosclerotic changes are prevalent but not necessarily an evidence of old age of the nervous system. The probability is that the process of growing old, if not subjected to the burdens of preceding diseases, as well as to stresses of over indulgence and of neglect, would in the nervous system, be reflected by a gradual diminution in energy of all its parts, and a similarly gradual decrease in its various functions.

The examination of the nervous systems of some of those who have attained an unusual old age does not reveal any pathognomonic signs. What changes are found are related to general atrophy in ganglion cells, a lessening in number of axones, in some general areas, such as the borders of the spinal cord and outermost cerebral areas, and a partial demyelinization. Focal lesions are rare. Nor in the absence of evidence of disorder, as in dementia, are there any Redlich plaques or Alzheimer's fibrillary changes.

Some of the neurological conditions seen in later life may be the residuals of disorders which began in middle or earlier life. In many cases cerebral thrombi leading to hemiplegia are not incompatible with long life unless complications occur. Often progressive muscular atrophies with an insidiously slow progress continue into late life. The same may be said of Parkinson's disease, idiopathic epilepsy, etc.

At times diseases ordinarily occurring for their first time at an earlier age, may begin later in life. Thus, although the majority of cases of trifacial neuralgia may be found to occur before the sixth decade, a number of cases begin after that time. The same is true of herpes zoster. While myasthenia gravis occurs in earlier life, in some the first attack may occur as late as the seventh decade.

When vascular disease has once begun, it progresses as the patient grows older. It is natural to expect that as the patient grows older cerebral vascular accidents may occur. Therefore, cerebral thrombi, at times embolism, often hemorrhage, cerebral thrombo-angiitis obliterans, all occur with relatively greater frequency in the later years. However, cerebral arteriosclerosis is not a characteristic of an old brain, and an old brain does not predicate cerebral arteriosclerosis.

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EXCLUSIVE of nosological entities, certain changes in function are to be expected in the later years of life. In general, the threshold for sensory apperception is increased, and touch, pain, and vibration sense particularly become defective. Various pains, at times designated as neuralgia, hyperaesthesias, muscle soreness and cramps may occur. The special senses likewise suffer. Loss of visual acuity rarely may be due to an optic atrophy, and progressive degeneration of the eighth nerve occurs. Without paralysis, and as a part of the general slowing down of voluntary motion, extraocular muscle movements may be limited and a broad field of vision obtained more by movement of the head than of the eyes. Diminution of the senses of smell and taste occur. The deep and superficial reflexes become sluggish and a laxity of rectal and bladder sphincters may develop.

Among the common disorders, which may occur without other evidence of neurological disease, is senile tremor. It is usually an alternate type of tremor, but in contradistinction to that of paralysis agitans and multiple sclerosis, senile tremor involves the head. Here it may be rotatory or nodding. Often the lower jaw is involved and a continuous chewing-like movement may be present. Frequently a family history of such tremors may be obtained and the condition classified as an essential tremor.

Some of the other characteristic disturbances, which may occur without other evidence of focal disease, are the flexor attitude of the trunk, at times associated with an osteo-arthritis of the spine, and slowness and paucity of movement, especially characteristic being the gait of "petits pas."

Among the diseases which especially may be classified among those occurring in later life are the muscle atrophies, senile chorea, senile athetosis, senile cerebellar atrophy, heredofamilial ataxias, senile paraplegia, both cerebral and spinal, progressive bulbar palsy, pseudobulbar palsy, senile epilepsy, myosclerosis, and Morel's disease.

Those presenile psychoses associated with characteristic pathology and the extrapyramidal syndromes may be considered separately.

THERE IS but little difference between the disorders mentioned above as occurring in the later period of life and the same disorders occurring at earlier periods. The muscle atrophies which occur are, of course, but rarely progressive. At times atrophy of the shoulder girdle and spasticity as from a corticospinal lesion such as that seen in amyotrophic lateral sclerosis occur. Usually the atrophy is limited to the small hand muscles, the thenar and hypothenar eminences and the interossei. Their cause is not well established, but the pathology probably may be found in the anterior horn cells. At times a progressive atrophy of anterior horn cells, less rapid than acute poliomyelitis, but more rapid than the usual spinal progressive muscular atrophy, has been observed and termed chronic poliomyelitis.

The choreas described as senile do not differ from adult chronic choreas but are differentiated from Huntington's chorea by absence of mental deterio-

ration, bladder disturbance and familial history. The acquired athetosis, the dystonias of torticollis, tortipelvis, myoclonus, are all indistinguishable from those occurring in earlier life as the result of encephalitis lethargica and other causes. As will be seen the predeliction of the basal ganglia and centrum semiovale for lesions, in this part of life, explains these isolated symptoms from limited lesions in these areas.

The ataxias are, without doubt, due to cerebellar disorder and the cerebellar atrophies, cortical or olivo-ponto-cerebellar, result in the same defects of function, whether occurring early or late in life. Senile epilepsy, often the result of thrombo-angiitis-obliterans, at times due to arteriosclerosis, differs only in that focal signs are more prevalent than in idiopathic epilepsy. Thus, transient paraesthesias or pareses limited to one or both extremities of one side, aphasias, homonymous hemianopsias, and various, especially visual, agnosias, are frequently encountered. The senile paraplegia of spinal cord origin differs but little from that due to vascular disorders of the spinal cord in younger years. At times it is characterized by a greater paraplegia in flexion and then may result from a combined degeneration of the spinal cord. In such cases, although a primary anemia may not develop, achlorhydria is constant and, at the same time, evidence of vitamin deficiency may be found. The cerebral form usually results from successive thrombi of the anterior cerebral arteries; a paraplegia rarely is the result of a myosclerosis. Morel's disease, which is characterized by endocranial hyperostosis, obesity, headache, epilepsy, polyuria, polyphagia, polydypsia and asthenia, differs but little from the syndrome of frontal endocranial hyperostosis so familiar as occurring in women at an earlier age.

At times a progressive bulbar palsy may be noted either at the beginning of a progressive spinal muscular atrophy, which is often of the amyotrophic lateral sclerosis type, or at the end of such a state. Quite often in later years such a progressive bulbar palsy which is characterized by dysarthria and dysphagia resulting from an atrophic paralysis of the tongue, the superior constrictor of the pharynx, the soft palate and muscles about the lips may remain limited to these parts. The progression of the disease is far less rapid than in the other forms. Frequently, explosive crying and laughing may be observed. At times, atrophy may not be detected for a long time and this fact has led to a conception of a pseudo-bulbar palsy as effecting internuncial pathways to the motor cells of the vago-spinal nuclei. As will be seen from later descriptions of such cases, this pseudo-bulbar palsy differs from that seen in bilateral subcortical lesions in that the signs of involvement of pyramidal or extrapyramidal tracts are absent.

Since arteriosclerotic changes are often well developed at the later period of life it is not strange to find that, as the result of softening of many parts of the cerebral cortex, we may be confronted with the signs and symptoms of their disordered functions. Thus, we may see hemiplegias, crural paraplegia, signs of frontal lobe involvement, with restless movements, picking,

patting and other stereotyped integration, sucking, chewing, grasping and groping, and visual extinction. Various types of aphasia are common, as are the agnosias such as disturbance of body scheme, acalculia, visual agnosias, cortical blindness and apraxias.

THE SUBJECT of the senile dementias is beyond the scope of this short paper. There are some presenile psychoses which present some interest. The interest resides in the fact that associated with these psychoses are signs of gross functional disturbance of the brain. Large areas of atrophy and certain histopathological changes are noted in them which do not ordinarily occur, even in the brain of very old people, unless a dementia is present. The two interesting presenile psychoses are Alzheimer's disease and Pick's lobar atrophy. Some controversy still exists as to their independent entity.

Alzheimer's disease is a progressive cerebral degeneration with the pathological picture of senility which develops in mid-life usually between 40 and 60. The symptoms are those of a progressive dementia with apraxia and speech disturbance. In the early stages there is loss of memory, carelessness of manner, dress and conduct. Dysarthria develops and as the disease progresses complete disorientation occurs. The speech becomes, at first, paraphasic, then greatly reduced to single words or phrases. Spastic contractures often occur.

The characteristic changes in histopathology are, first, changes in the fibrillary structures of the ganglionic cells in the frontal poles and the cornu ammonis where one sees the prominent neurofibrils, stained black, forming loops, baskets or twisted cords. The other change is a profusion of Redlich or "senile plaques" containing a great number of degenerated Hortega cells. The interest in the latter resides in the fact that brains of quite old people, without dementia, contain but few of these plaques and they are of a benign type. In senile psychoses and especially in Alzheimer's disease they occur at relatively young age in profusion.

The second of these disorders, Pick's disease, or circumscribed cortical atrophy, is characterized by circumscribed atrophy of the cerebral cortex usually confined to the frontal and temporal regions. The age of onset is from 50 to 60. It is characterized by progressive dementia and aphasia. At the end the patient's speech is reduced to a few stereotyped phrases. In the terminal state the patient becomes emaciated and contractures develop. However, neither senile plaques nor neurofibrillary changes are seen.

IF ONE pictures an old man, a certain pattern is rather constant and calls attention to involvement of the extrapyramidal motor system in varying degrees of dysfunction. Among these is the posture which is characterized by flexion of the spine and head—so much so in regard to the head that when the patient is supine the head is elevated as upon a "psychic pillow"; there is flexion of the forearms and fingers, rigidity in varying degrees, poverty of movement as well as slowness, and, at times, tremor. When these com-

ponents of flexion attitude, rigidity, poverty and slowness of movement are present in some intensity they constitute the picture of Parkinsonism. However, they are not in any single case the counterpart of the picture of Parkinsonism or Parkinson's disease.

The rigidity, which Foerster described as arteriosclerotic rigidity, differs in the following respects from that seen in Parkinsonism: a greater continued resistance, not comparable to lead pipe resistance, not associated with a cog wheel resistance, and it is more obvious in the proximal than distal parts and in the legs more than the arms. It further differs in that it often develops in steps and not gradually, and that it is associated with changes not attributable to the extrapyramidal system alone. Thus, with pseudobulbar palsy, dementia and spastic crural paraplegia, although the rigidity results from the consequence of vascular changes in the globus pallidus, other changes in nearby structures result in signs not found in Parkinsonism. The rigidities, the flexor attitudes, the poverty of movement and the bradykinesia do not, as a rule, progressively and gradually develop. Having begun on one side they might relatively suddenly involve the other. At that time such signs as pseudobulbar palsy or dysarthria and dysphagia, involuntary, explosive crying and laughing, and thalamic pain develop.

Difficulty in standing or poverty of movement resulting from rigidity is not the same as is seen in Parkinsonism. It is, rather, a disinclination to move rapidly, to gesticulate, to change one's position. Of course, when muscle rigidity is markedly developed one sees the same difficulty of starting to walk, for example, as in Parkinson's disease. The gait of petits pas, when seen in Parkinson's disease, is usually associated with propulsion. This is not so in the rigidity. Not infrequently one observes in the cases of arteriosclerotic rigidity a tendency to catalepsy, especially when some mental deterioration has occurred.

Although senile tremors are common, the type of tremor usually seen in Parkinsonism is rare. It is, as in Parkinsonism, essentially a tremor of rest; however, it does not disappear as regularly with intended movement. In fact, in the majority of cases it is increased in amplitude with movement. In many cases of arteriosclerotic rigidity there may be no tremor. The reason for the predilection of the changes for the basal ganglia is not known. These arteriosclerotic changes affect the smaller vessels and lead to a worm-eaten or sponge-like appearance of the necrotic areas. However, this peculiarly selective vulnerability is an indication for research. The reason will be found not so much in the nervous system itself as in its vascular supply.

It is of interest to note that many of the conditions described lead to a reversion to primitive functions; thus, the infant-like sucking and chewing, the grasping and groping, the stereotyped patting and picking. Others affect the very functions developed quite early and associated with the oral region as in the case of defective chewing, swallowing, forming of sounds, and the release of unmotivated laughing and crying.

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The Elderly Surgical Patient

THERE IS an increasing necessity for the surgeon's appreciation and evaluation of the elderly patient. During the past decade there was an increase in the population who reached the age of 65. In view of this fact, a greater amount of surgery would be expected in this group. The dangers of operating on patients over 50 are definitely known to be greater. The mortality in patients over 60 is thought to be about 9 per cent in the elective surgery. Contrary to the usual belief, elderly people do not withstand operations well, although many tolerate surgery without difficulty. A thorough knowledge of every patient should be had before undertaking surgery. A measurement of the chronologic age is not as significant as the physiologic status. Many people at 50 may be years older than their actual age.

The anatomic and physiologic changes are of much importance in estimating the biologic status of each individual. For the most part there is a delay in secretory activity, which in turn leads to poor dietary habits, vitamin deficiencies, and malnutrition. The inability to decrease the bulk of the food and to prepare it properly for assimilation is significant. Pepsin, trypsin, and lipase are decreased in the resting state but may be increased after stimulation. Carbohydrate metabolism, therefore, shows a definite impairment.

It is essential that adequate proteins be taken in order to protect and aid in the resistance to infection and to hasten recovery. Protein requirements higher than the average thus are present in all elderly patients in the preparation for surgery. In summarizing, the gastrointestinal tract in the elderly patient has a smaller capacity to retain and utilize the proper diet. Renal im-

pairment is not necessarily an accompaniment to old age unless there is an associated disease of the kidney or other vital organs. It is essential, therefore, that the elderly patient receive a high protein, moderate carbohydrate, low fat, and high vitamin diet. It must be realized that the usual functional tests may reveal no systemic impairment, but there may be a decrease in reserve under the stress of an operative procedure.

The cardiovascular system is of most importance and should be completely investigated. The cardiac reserve, the history of cardiac disease, and the degree of compensation if such disease is present, are factors for consideration. Cardiac disease, however, is not a contraindication to indicated surgery. The need for surgery must be measured against the actual risk involved.

Renal function should be determined in all instances. Blood constituents and urinary tests should be mandatory; and most important, the specific gravity and output of the urine should be known. In elective cases the urinary function should be improved when time is available.

Malignancy is the most common cause for surgical intervention in the elderly patient. A complete evaluation of the patient must be made and an exact measurement of the patient's capacity must be known before undertaking surgery. There is no argument that surgery be withheld from patients whose life is dependent upon it, even with an associated risk. In advanced cases many patients should best receive conservative measures for palliation, if more radical procedures cannot be performed. Wangensteen, however, believes that with adequate preparation, compromising procedures should not be done, but an attempt in all instances for cure should be made. The psychic factors in the elderly patients cannot be minimized. Many disturbances in the normal routine may be enough to upset them. The least psychic trauma should be the aim in all instances. Careful handling of each patient with diligence and skill is necessary during the hospital stay.

The acute surgical abdominal problems must never be lost sight of in the elderly patient. Considerable delay is usually experienced as a result of fear, lack of consideration of the symptoms, and also the desire to be of the least trouble to the family. The family and attendants should be well aware of all suspicious symptoms of acute abdominal disease. The avoidance of unnecessary illness and the prevention of further disability can be facilitated by early treatment. This is demonstrated in patients suffering from biliary disease who are not treated when the diagnosis has been made, only to develop an obstructive jaundice from a stone in the common duct. If early surgery had been done, the morbidity and mortality could have been decreased.

The problem of hydration is of much concern in the older group. The adequate intake and utilization of fluids may be the key to most problems. The estimation of the requirement can be determined by means of the hematocrit, specific gravity of the blood, total blood counts, and the existing physical status. Emphasis must be placed on the dangers of over hydration as well as of dehydration. If too rapidly administered, intravenous fluids may result in heart failure and pulmonary edema. The speed and amount of fluids must of necessity be gauged by the needs and existing conditions.

Sodium chloride administration requires much emphasis with particular reference to the elderly patient. Normal requirements of sodium chloride are from three to ten grams daily, and the administration of larger quantities results in edema and sodium intoxication. Ravdin has emphasized the role

of hypoproteinemia in the production of edema in the poor risk patient. An increased administration of sodium may produce an edema and considerable disturbance in the process of wound healing. Protein needs should be known and a sufficient quantity should be administered before undertaking surgery if possible.

Whole blood is to be given in quantities to restore normal blood volume and to correct existing anemia. The giving of large quantities of blood, however, carries the added danger of all parenteral fluids plus the risk of all transfusions. Extreme caution must be exercised in matching, preparation, and administration of blood, since elderly patients are least equipped to withstand the potential resulting reactions.

Elderly patients do not tolerate barbiturates and opiates well. The administration of these drugs should be withheld when possible and cautiously given when necessary. When Lord Moynihan stated that "surgery has been made safe for the patient, and now the patient must be made safe for surgery," he must surely have had the older person in mind.

J. D. MARTIN, JR., M.D.

Reprinted from the Southern Surgeon.

Doctors Serving New York 50 Years Honored

MORE THAN 30 doctors, each of whom has practiced in or about New York City for fifty years or more, were honored December 7 at the New York University-Bellevue Medical Center during ceremonies commemorating the merging in 1898 of the former Bellevue Hospital Medical College into New York University College of Medicine.

Highlight of the speaking program and reception, which marked the event, was a tribute paid by Dean Currier McEwen, speaking on behalf of the Medical Center, to veteran doctors graduated in 1898 or before. Thirty-two of the cited doctors were present and received the tribute in person. Also present were doctors who were undergraduates of the College in the years immediately following the merger, together with leaders of the Medical Center and officials of the Department of Hospitals of New York.

Among the doctors honored were: Dr. Nathan B. Van Etten, past president of the American Medical Association; Dr. Samuel A. Brown, acting chairman of the board of trustees, New York University - Bellevue Medical Center; Dr. William Logie Russell, professor emeritus of psychiatry, Cornell University Medical College; Dr. Thomas A. Gonzales, medical examiner of New York City, and Dr. John F. Erdmann and Dr. John J. Moorhead, New York surgeons.

Among other distinguished alumni present were: Dr. Homer Swift, formerly director of the Rheumatic Fever Service, Rockefeller Institute for Medical Research and during World War II acting director of the Rockefeller Hospital; Dr. John M. Hanford, now a member of the Columbia University medical faculty; and such noted New York physicians as Dr. Hervey C. Williamson, Dr. Luther B. MacKenzie, and Dr. Claude Heaton, New York medical historian.

DIGESTS *from Current Literature*

Public Health and the Diseases of Old Age.

LOUIS I. DUBLIN, M.D., *Statistical Bulletin, Metropolitan Life Insurance Co.*, 29, No. 4: 1 (April) 1948.

The basic shift in the mortality picture in the United States since 1900, has been toward a higher incidence of diseases of later life which terminate fatally. The percentage of the population over 65 years of age, which was 4.1 per cent in 1900, was 6.8 per cent in 1940, and is anticipated to reach 9 per cent by 1960. At the beginning of a new century the number of persons over 65 may well have reached some such figure as 13 per cent.

Since the major problems of sanitation and of communicable disease control are now solved there should be determination to wrestle with the cardio-vascular-renal diseases which are the leading causes of death in older individuals. Much can be done to prevent heart disease among adults and to prolong the life of cardiac patients through education for good living habits and against the dangers of overweight and overstrenuous physical activity.

Under present conditions of mortality, one out of every nine white males born and one out of every seven white females born, will eventually die from cancer. The tragedy is that far too many cases are discovered at the later stages, when little can be done for the patient. Probably the mortality from the disease can be cut by one-third through the early detection and adequate treatment of cases.

Diabetes is another important disease of later life against which progress can be made through a sound public health program. Of the 2,000,000 diabetics in this country, nearly half of them are unaware of their disease. These should be sought out and carefully supervised as they grow older.

The primary responsibility of the health officer should also be one of helping coordinate the efforts of the health department with efforts of private physicians, and voluntary health and safety agencies, for more effective control of tuberculosis, pneumonia, mental disease, nutritional diseases, and accidents.

Risks Associated with Anaesthesia of the Aged.

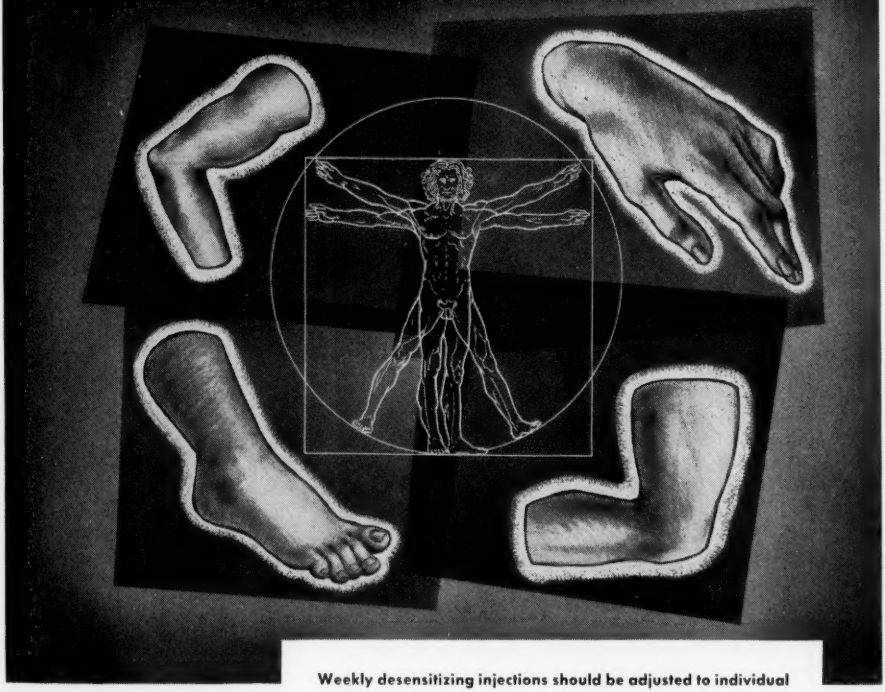
P. L. JOBSON, *The Med. J. of Australia*, I, No. 5: 138-140 (Jan. 31) 1948.

In the aged there is a retardation of the tissue oxidation rate, a fundamental fact of importance to the anesthetist, whose responsibility it is to produce a properly respirable atmosphere for the old patient during and sometimes after operation. In the respiratory system there is limitation of vital capacity due to kyphosis, rigidity of the costal cartilages and diminished elasticity of lung tissue; often inflammatory processes of long standing are present at the lung bases. Frequently the protein intake is low in the aged, so that there will often be a dangerously low protein reserve lurking behind an apparently normal serum protein level.

The effects of sedative drugs, morphine especially, are pronounced in old people; dosage should be reduced in proportion. Sulphonamides appear to be tolerated well in old age, but cyanosis should be avoided. "Avertin" and some barbiturates should be dealt with more carefully, if liver action is slow; and there is a possibility of cumulative effect. The use of fluids must be watched very carefully.

Anesthetics in themselves do not

suggestion for using B.I.P.* in arthritis



Weekly desensitizing injections should be adjusted to individual thresholds of tolerance and should avoid any reaction.

Each graduated dose should be such that increased comfort and diminished joint pain or muscular stiffness is experienced. *If this relief lasts for the entire week,* the dose should remain the same. *If it lasts less than a week,* the dosage is usually increased 1/20 cc. or 1/10 cc.

The initial dose is 1/10 cc. intravenously. Top dose is usually well under 2 cc.

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cause much harm to the heart, but mismanagement during or soon after anesthesia most certainly can. In people with raised venous pressure, apart from obvious dangers of anoxia, resistance to inspiration may cause pulmonary edema. With the use of local anesthesia, as little sedative premedication as possible should be given. Spinal anesthesia is well tolerated, but high spinal anesthetics carry a great danger of hypotension and are seldom applicable to the aged. Laryngeal spasm under "Pentothal" anesthesia in old people is a fearsome thing, but if the old patient is edentulous and the jaw muscles relax easily, it is not difficult to insert an endotracheal tube and pack off the larynx. Cyclopropane is an ideal anesthetic for the aged, induction and recovery are quick, oxygen percentage may be kept high. Induction with a small amount of Pentothal (about 10 cc.) which is better used in 2.5 per cent solution for susceptible subjects, and continuation with cyclopropane make an excellent anesthetic. In the combination with curare, more than usual care must be exercised with old people. If ether is used, salivation and mucous secretion must be avoided. Suction down the trachea is the best way to remove them. At the first sign of fall in blood pressure, ephedrine should be used intramuscularly. The effect of Neo-Synephrin given intravenously is dramatic, often raising the systolic pressure 70 to 100 mm. In certain cases premedication with Omnopon (one-sixth of a grain) and scopolamine (one three-hundredth of a grain) given an hour before, is recommended.

Bibliography of 8 references.

Aftercare of the Aged Sick.

E. N. THOMSEN, M.B., and M. CURRAN, M.B., *Lancet* (London), 2, No. 7: 241, 1948.

Disease in old age need not necessarily involve long-continued illness and helplessness in even the majority of cases. However, a stay in the hospital is a crucial period for such individuals, and after discharge they require more follow-up care and general supervision than does a younger adult. E. N. Thomson, M.B., and M. Curran were somewhat surprised to observe, in checking up upon male patients over 65 and female patients over 60 years of age who had been treated at the two Glasgow municipal hospitals, that only one-third of them had required as much as a month's stay in the hospital and at the time they were recontacted only one in six or seven was in need of rehospitalization.

Patients suffering from cardiac disease seemed to require special attention. Being prone to lead over-sedentary lives and with little to do except think about themselves, they were able to benefit very much from "therapeutic occupation." This must be selected with a view to physical resources and should produce something with economic value to help along morale. The elderly person with a hobby will almost invariably live longer and will be sick less often than will a comparable individual without a similar interest.

Work with the families of elderly patients after they leave the hospital is almost as important as whatever may have been done for the patient himself. Excessive coddling with insistance that the patient remain in bed may lead in a relatively short time to bedfastness and even early death. Even the patient who has had a cerebral accident with residual paralysis should be kept up and about after his return home. Less than 10 per cent of elderly patients must necessarily be confined to bed when they return home from the hospital even though an additional 30 per cent or so may be unable to care for themselves completely.

The incidence of readmissions to the hospital may be reduced through the services of visiting nurses and by having available physician service for home visits. Where this type of medical supervision is provided in the home, it is unusual to find that the patient has regressed in his general

for the convalescent

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Kondremul, when properly administered, does not disrupt or interrupt the normal processes of digestion and absorption. It does not cause griping or gas pains. Patients like its pleasant flavor, its smooth creamy texture and the absence of any oily taste or aftertaste. Kondremul tends to restore regularity by lessening the patient's tendency to postpone difficult or uncomfortable movements.

Kondremul is prescribed at bedtime in a glass of water in doses of one to two tablespoonfuls.

There are three types of Kondremul: plain, with non-bitter extract of cascara, and with phenolphthalein.

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health after he has been out of the hospital for some time.

Where rehospitalization becomes necessary the patient always prefers to return to the hospital rather than to be sent to a home for the aged. He anticipates that he will be discharged from the hospital in a few weeks after good nursing, a rest, and general care plus whatever medical or surgical treatment is necessary. However, since considerable numbers of such patients require only general medical or nursing care convalescent homes are a better answer to their problem than general hospitals. The medical needs of such patients may usually be met by the general physician. The nursing in such convalescent or recovery homes requires only a few skilled people with most of the staff made up of assistant nurses and general help. Such work should be a part of the training of all young nurses to teach them the care of the elderly.

Gynecologic Aspects of Geriatrics.

GERALD ROGERS, M.D., F.A.C.S., *J. Okla. State Med. Assoc.*, 41: 321-325, (Aug.) 1948.

Post-menopausal bleeding, genital prolapse, pyuria, and tumors constitute 80 per cent of the gynecologic problems among patients 60 years or older, according to Gerald Rogers, M.D., F.A.C.S., of Oklahoma City.

Post-menopausal bleeding was the chief complaint in 48 per cent of patients studied. The diagnosis may be established by physical examination and histologic studies. Where the diagnosis cannot be made by such means, repeated curettage at 3-month intervals is advised.

Functional bleeding should not be treated by hysterectomy. In the absence of malignant change treatment must be conservative.

In 40 per cent of cases, bleeding is due to a benign lesion usually in the vagina or cervix. Among the most common causes is senile vaginitis. Dilatation is done to correct deformities that may be present. Estrogenic hormone

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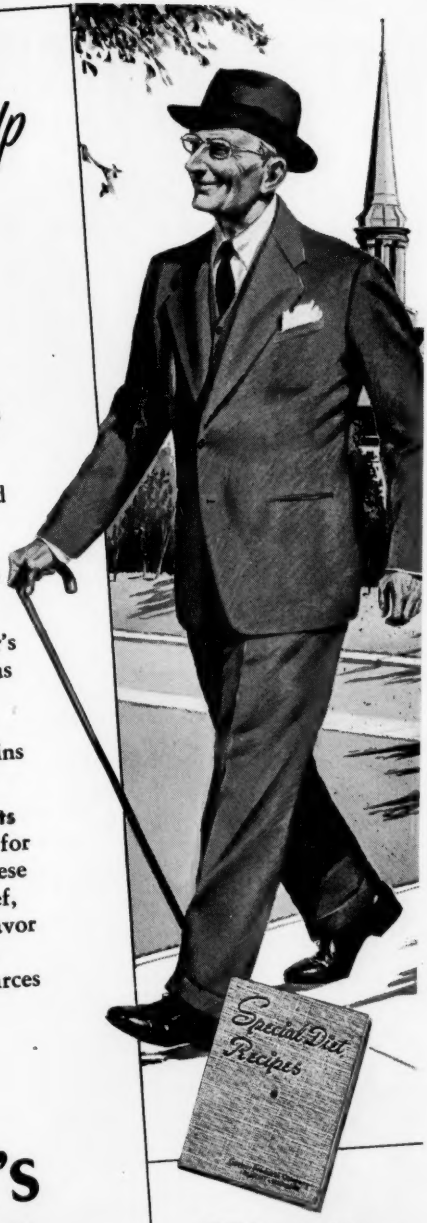

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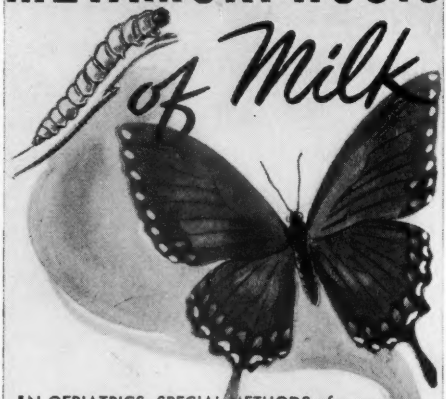

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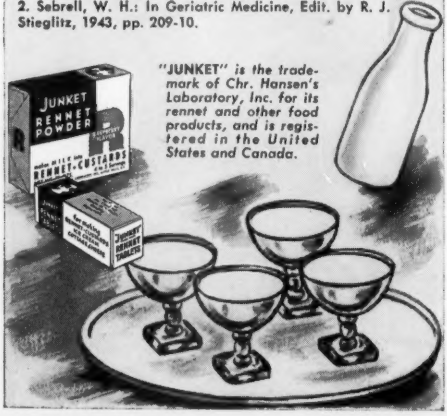
2. Sebrell, W. H.: In Geriatric Medicine, Edit. by R. J. Stieglitz, 1943, pp. 209-10.



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therapy may be employed together with carbohydrate suppositories and acid douches. Antiseptics are useful only for specific infections with bacteria or fungae. Protozoal infections disappear with restoration of normal flora and vaginal pH. Vitamin A may be tried.

If trophic ulcers of the cervix or vagina fail to yield to treatment promptly, malignancy must be suspected.

Benign cervical polyps and erosions may produce bleeding. All polyps should be removed for biopsy.

Endometrial polypi, stenosis of the cervix, endometritis and uterine fibroids also may cause bleeding.

Bleeding is the initial symptom in 40 per cent of cases with ovarian tumor. After the age of 40, the incidence of malignancy is high.

Cancer, producing post-menopausal bleeding, occurred in more than half the cases reported. Bleeding is a late symptom and efforts should be directed to earlier diagnosis. Carcinoma of the cervix is most common. Carcinoma of the corpus comprises about 6 per cent.

Since endometrial hyperplasia is dependent on ovarian function, the post-menopausal patient presenting an endometrial hyperplasia should be investigated for a granulosa-cell or a Brenner tumor. If palpation reveals an enlarged ovary, laparotomy is advised.

Prolapsus uteri may be treated either by vaginal hysterectomy, interposition operation, or parametrial fixation procedures and colpocleisis. In complete prolapse, if the patient is a good surgical risk, vaginal hysterectomy is the procedure of choice.

Pyuria is a common finding in elderly women and is frequently associated with prolapse and cystocoele. Treatment consists of appropriate antiseptic chemotherapeutic or antibiotic agent, rest, diet, bladder lavage and indicated surgical procedure. A doughnut pessary may be helpful temporarily. Hematuria, when present, warrants further urological investigation.

The incidence of tumors declines in the sixth, seventh and eighth decades. They are usually primary and slow growing. Fibromas and lipomas are the most common. Ovarian tumors should be removed if the patient's condition will permit.

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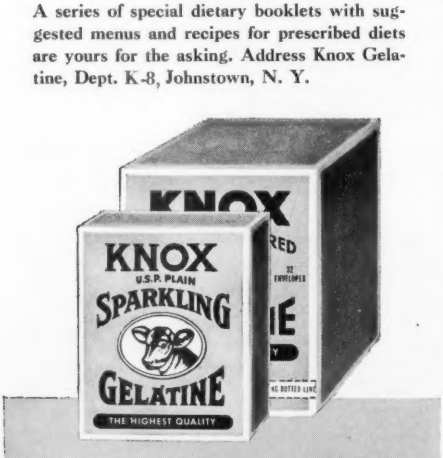

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If leucoplakia and kraurosis fail to respond to Vitamin A and hormone therapy, complete excision is advised.

Nutritional Status of Older Women.

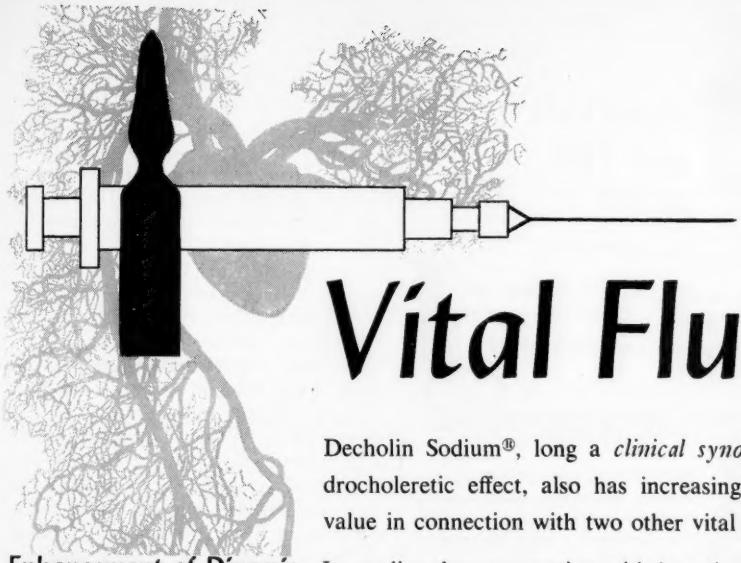
P. HARRIETT ROBERTS, CHARLOTTE HERMAN KERR, and MARGARET A. OHLSON, *J. of the Am. Dietetic Assoc.*, 24, No. 4: 292-299 (April) 1948.

Older women appear to eat food from the same basic dietary pattern, as that of young adult women. However, since their caloric intake is less, they also eat correspondingly less of the specific nutrients, since little selection is practiced, and the dietary chosen is diluted by a high proportion of sugars and fats.

A lowered basal caloric output in older women has been demonstrated, and it is assumed that a lower caloric intake must be maintained if excess weight is to be avoided. However, there is no evidence that a corresponding reduction of intake of specific nutrients is useful. In fact, many women show a considerable degree of demineralization of the skeleton by fifty years of age.

Senescence may be assumed to be accompanied by a gradual loss of substance from the body. However, it is reasonable to suppose that equilibrium or intermittent storage of specific nutrients would characterize the period of adult vitality, and that persistent failure of retention would result in early aging. Such nutritive failure is more common in women than in men.

In the tests during certain periods, 250 I.U. of vitamin D, as cod-liver oil or irradiated ergosterol were administered, and six subjects were given calcium gluconate, equivalent to the calcium supply of one or two cups of milk, daily for one or several periods.



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It was estimated that an average intake of 9.4 gm. nitrogen or 57 gm. protein was required for equilibrium, although as demonstrated by tests, individuals were in nitrogen balance at intakes from 5.5 gm. upwards, or from 34 gm. protein upwards. It was also found, that a mean intake of 1067 mgm. of calcium per day was required in the test group of aging women. Thus the calcium requirements are higher for older women than for younger adults; at least 1 gm. daily is suggested for healthy older women.

The prolongation of the adult basal metabolism in the later decades may be one of the measures of vitality in the aging woman.

5 tables; bibliography of 19 references.

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GERIATRICS

The Orientation of Geriatrics*

Edward J. Stieglitz, M.S., M.D., F.A.C.P.†

No problem, or area of thought, is an isolated entity. Comprehension, in its fullest sense, involves orientation. The more clearly and precisely we can see a target, the better will be our score of direct hits. Seeing a target should imply more than merely detecting its existence. Its composition, activities, potentialities, inherent characteristics, and relationships in time and in space relative to its encompassing environment are all important facets of seeing or understanding. Clarity of perception and completeness of comprehension are inevitably dependent upon the ability of an observer to apply perspective. A sense of proportion is derived only from multiple perspectives.

To understand man fully is the aim of every true physician. Man is an infinitely complex organism and one of his fundamental attributes is that he ages, and, as he ages, changes. Therefore, it becomes the responsibility of every physician concerned with the care of the aging and the aged to understand both man and his aging, as well as the disease entities which beset him after maturity. For such comprehension, an awareness of perspective relationships is essential.

We of the medical profession have deliberately sought responsibility by our selection of medicine as a career, recognizing, perhaps unconsciously, the

*Read at the Fifth Annual Meeting of the American Geriatrics Society, Chicago, June 17, 1948.

†Graduated from Rush Medical College; Member, American Geriatrics Society, Gerontological Society, American Diabetes Society.

inseparable relationship which exists between responsibility and privilege. Solving problems is our daily and continuous task. That these problems are becoming increasingly complex and more and more urgent is known to all. Not only are the numbers, both absolute and proportional, of senescent individuals increasing dramatically, but our comprehension of the inter-relations of constitution, environment, emotional factors, nutrition, and pathogenesis has expanded rapidly. As our means of accomplishment have grown, so has our awareness of the complexity of our problems.

In the early days of medicine, the responsibility of the physician was limited almost solely to the alleviation of individual suffering. It is only recently that our growing awareness has added the responsibility of preventing unnecessary disease, and still more recently, of building greater health for all people. For many centuries physicians were obliged by the rules of ethics and by natural diffidence to wait for people to get sick, and, furthermore to wait until these people were sufficiently distressed in mind or body for them to seek guidance and relief. For far too many years medical education has been predicated upon the assumption that the function of the physician was to discover, identify, and treat disease. Such a limiting attitude is no longer tenable and its further perpetuation can but retard the progress of both medical science and practice.

Advancing knowledge has demonstrated that health can no longer be regarded as "that state of being existing in the absence of disease." Such a sadly negative concept is grossly inadequate today. Health is relative, never absolute. It is a positive phenomenon which may be tentatively defined as that state of being in which all the functional capacities, both somatic and psychological, are at their maximum effectiveness. Health, in this sense, is conspicuously affected by aging. Perfect health is an abstraction, an ideal. Though perfection in health is perhaps approachable, like infinity, it is probably unattainable. Nevertheless, discontent with "normal" or average, and constant effort toward approaching an optimum in health are necessary for fundamental progress.[1]

We are here concerned primarily with the medical problems of aging men and women. But these problems can not and must not be isolated, for they constitute part of the whole. The present shifts in age distribution in the population and the gigantic and increasing toll of chronic illness and progressive disablement relate the purely clinical application of knowledge to several other facets of this immense problem. A clearer definition of the specific but related responsibilities of physicians, society, and individuals is needed.

Looking afield from our own small selves and our immediate pre-occupation is both difficult and discomforting. We all try to avoid scanning distant horizons. Nevertheless, study beyond the confines of specialized techniques and disciplines is necessary for the maintenance of adequate perspective. Many clinicians are prone to sneer a bit at "ivory towered investigators"

and, likewise there are those among the experimental scientists who consider the practice of medicine a prostitution of science by the practice of conjecture. The specialist has been defined as the man who knows more and more about less and less until ultimately he knows everything about nothing. Though the original comment was undoubtedly intended to be facetious, sadly enough there is a good deal of truth therein. We all tend to stay within the narrow rut of routine. Routine seems so secure and so satisfying. But the security of routine is only apparent and not real. Furthermore, it is hardly worth the inevitable price of persistent deepening of the rut until it becomes indistinguishable from an intellectual grave. The world is critically ill. Mankind, having barely survived a catastrophic war, lies prostrate, starved, and so desperately despondent that any new trauma may lead to a virtual suicide of the species. Mental illness, whether individual or *en masse,* is a medical problem just as much as more obvious epidemics of somatic disease. Panic may be as contagious as small pox and equally devastating.

As clinicians interested in geriatric problems, our particular relationship to the problem of a peaceful world becomes apparent when it is realized that the primary hope for lasting peace depends upon the development of a greater emotional maturity of all peoples.[2] Only the physically mature (senescent) can be expected to develop sufficient emotional maturity with concomitant tolerance, patience, understanding, judgment, and objectivity to assure us peace. Let me not mislead you, however. Somatic maturation, or even senility, is no guarantee of emotional maturity. Maturation is characteristically asymmetric. Age *per se* is no promise of mental maturity; the so-called "second childhood" of senility is truly merely a continuation of the first childhood. Children are sure to grow, but they do not necessarily grow *up*. Nevertheless, symmetrical maturation, fostered and cultivated by geriatric medicine, is the most promising ray of hope in the dismally chaotic morass of today. This alone, I feel, justifies a philosophic consideration of the orientation of geriatrics.

FOR PROPER orientation, three distinctive viewpoints are necessary to obtain effective perspective. Omission of any one of these will result inevitably in an incomplete, distorted, and asymmetric comprehension. The triad of viewpoints is applicable to all problems, as well as those of geriatric medicine.

The first viewpoint is the application of the naked eye. The indivisible individual is the unit of operation. This is the field of geriatric medicine, concerned with the *application* of medical science to the health of individual aging men and women. Secondly, we must take the individual apart and examine its various constituents and reactions with microscopic magnification. Lastly, we must step back far enough so that the objects (in this instance, aging men and women) may be inspected and investigated with a telescope and thus related to their total environment. In other words, a close-up view, without a background or setting, invariably results in a false appraisal of values. An ant hill seen through a magnifying glass becomes a

mountain; studied only through a telescope it becomes invisible. Neither evaluation is correct. To find truth all three approaches are required.

PHRASED a little more specifically, we may say that full comprehension of the meaning, potentialities, implications, objectives, and disciplines of geriatric medicine demands three approaches: (1) the indivisible individual, psyche and soma as one unit of study. This is clinical geriatric medicine. (2) Magnification of all component parts, biochemical reactions, electrical potentials, cellular structures, and functions which make up the individual are the concern of the biologic sciences, upon which clinical medicine depends for understanding. And (3) man is a member of society, a unit in the external environment, which affects his environment and is simultaneously affected thereby. Man as a member of society is the concern of that area of study which we may call social medicine.[3]

It may be useful to express the relative importance of the three perspectives in a slightly different manner. In the center we have man, the core of all our objectives in clinical medicine and all our endeavors in research and in study. Each man is composed of approximately two billion cells. Thus, when we apply magnification and the cell becomes the unit of study rather than the individual as a whole, we see that we are dealing with approximately two billion individual units which in complex combination make up the organism man. When these cells function harmoniously, man is healthy. On the other hand, society over the world at large is composed of approximately two billion human beings. Thus, society can be considered as a composite individual having as its component parts, individual men and women. Social illness or disorder arises when the individuals creating society fail to function properly and cooperatively, often because of their own impairment of health.[4]

GERONTOLOGY, which is the science of aging in its broadest sense, is concerned with all three of these perspectives. There is little need to define to this group what is meant by the science of medicine or the biology of senescence. To explore these areas in any detail is beyond the scope of the present paper. However, there is so much confusion as regards what is meant by social medicine[3] that it may be worth while to attempt a definition at this point. Social medicine does *not* mean "socialized medicine." The application and payment of medical care, whether it be government sponsored or by individual private practice, is but one small facet of social medicine. Social medicine is concerned with man as a member of society, as defined by Crew[5] and many others.[6] Social medicine deals with both psychological and somatic health *en masse*. We may contrast social medicine with clinical medicine as wholesale *vs.* retail. We may also say that social medicine is the equivalent of a maturing attitude in public health thinking. As with maturation of an individual, there appears a growing breadth of view and awareness of correlations with other sciences heretofore neglected. Social medicine is not a newly created discipline. The maiden, public health, has married sociology

and thus changed her name. Though altered by this phenomenon of maturation and learning from her consort, she carries with her all the hereditary and acquired characteristics of public health. Let us hope that this marriage will be a fertile union. Social medicine is based primarily upon the fact that man can not be isolated from his environment. Though we have learned much concerning homeostasis in the internal milieu through the basic physiologic studies of Cannon and other physiologists, we must not become so diverted and intrigued by these that we forget there exists also a most significant external environment. This external environment has many facets: physical, social, psychological, toxicological, and economic elements, all warrant consideration.

It becomes obvious that gerontology involves a great many divisions of the biological, physical, and social sciences. Botany, zoology, anatomy, physiology, immunology, sociology, political economy, psychology, biochemistry, pathology, and even metallurgy and colloid chemistry, are all disciplines which can contribute to understanding the processes of aging. It must not be forgotten that non-living matter ages as well as that which is alive. Witness the changes occurring in metals or colloids with the passage of time. Gerontology is interested in aging as a phenomenon, as well as the consequences of aging in the individual.[7] Aging must be considered not only from the point of view of the individual, but also from the point of view of the aging of the species, for various species are unquestionably of different evolutional or involutional age.[8] Cultural maturation of social groups is a phenomenon of aging.[1]

These preliminary comments make it obvious that gerontology is so broad a field, involving so many scientific disciplines and presenting so many divergent ramifications, that analysis and development of some tentative skeletal structure is necessary. As knowledge advances, our basic conceptions of the inter-relationships of the various areas will undoubtedly change. What may appear to be of pre-eminent importance today may prove to be relatively inconsequential in the future, and *vice versa*. Nevertheless, some form of blue print or map is necessary. That it will be repeatedly revised and altered is to be expected. For both clarity and brevity it appears best to make our early attempts at organization in outline form, wherein the three major categories are amplified by indicating certain typical and representative areas of thought and investigation. The outline is admittedly incomplete and is offered only with the hope that it may assist us toward better comprehension of the ramifications of gerontology and the orientation of geriatric medicine:

THE DIVISIONS OF GERONTOLOGY

1. Geriatric Medicine: The Clinical Problems of Aging Individuals
   1.1 "Normal" senescence and senility
      1.11 Physical aspects
         1) The relativity of health[9] (especially in relation to age)
         2) Asymmetry of aging change[7]
         3) Optimum *vs.* average or "normal"
         4) Evaluation of functional capacities (Stress tests to reveal reserves)
         5) Role of nutrition
      1.12 Mental aspects
         1) Intellectual maturation
            a) Changes in interests; perspective[1]
            b) Ability to learn[10]
            c) Memory[11]
            d) Originality
            e) Role of habit patterns
         2) Emotional maturation
            a) Genesis of asymmetry
            b) Motivations
            c) Cultivation of self-discipline
   1.2 Disorders of the Senescent Period (Both somatic and psychic)
      1.21 Modifications of diseases by age change in patient
      1.22 Characteristics of disorders typical of senescent period ("degenerative disorders")
         1) Classification (major groups)
            a) Circulatory: arteriosclerosis { cerebral { apoplexy, dementias; coronary; aortic; extremities; pancreas; kidney } hypertensive disease
            b) Metabolic: { diabetes mellitus; gout; anemia; thyroid dysfunction; climacterics }
            c) Neoplasmata
            d) Arthropathies
         2) Generic characteristics[12]
            a) Multiple, obscure, endogenous, cumulative etiology

b) Asymptomatic onsets
c) Progressive course (prolonged disability)
d) Overlapping; superimposition of several disorders simultaneously; enhancement of vulnerability

3) Implications
a) Common denominator is affect on cellular nutrition by inducing:
Inadequate supply and/or
Inefficient distribution and/or
Ineffective utilization and/or
Incompetent elimination
b) Specificity in diagnostic separation unfeasible[13]
c) Relative greater importance of etiology and physiologic consequences in chronic progressive disease (the health of the patient *vs.* treatment of the disease) in contrast to the simple exogenous diseases of youth[14]

2. The Biology of Senescence
2.1 Phenomena of evolution and involution
2.11 Anatomic
2.12 Physiologic
2.13 Homeostatic
2.14 Biochemical
2.15 Psychological { memory, motivation, learning capacity, judgment }
2.16 Nutritional
2.2 Theoretical (pathogenesis senescence)

3. Social Gerontology
3.1 Economic
3.11 Employment
a) Costs of premature retirement
b) Costs of delayed retirement
c) Placement
3.12 Chronic illness and invalidism; institutional facilities
3.13 Pensions; retirement
3.14 Cost of dependent aged on { families, communities }
3.15 Housing facilities "normal" aged

3.2 Cultural
3.21 Education for senescence of { youths, adults, senescents }

3.22 Marriage (present expectancy of average married woman is eight years of widowhood)
3.23 Family attitudes toward the aged
3.24 Social attitudes toward the aged
3.25 Cultural maturation (both individual and social)
3.26 International aspects maturing populations

As stated previously, this outline is grossly and admittedly incomplete. Many more related areas could be included. But it is intended merely to indicate the vast potential ramifications of the central theme: the problems of aging. An age of age is here. The primary tragedy of senility is awareness of uselessness. The objectives of geriatric medicine must include amplification and improvement of life in all of its several dimensions. Mere length is not enough; depth and breadth are equally essential. It is thus the obligation of those of us concerned with the practice of geriatric medicine to be cognizant of the problem as a whole, as well as with the purely bedside care of the aged and infirm.

Perspective is vital to the practice of medicine. For example, it is essential for diagnosis, for no diagnosis is complete without consideration of causation. The effectiveness of curative and preventive therapy is predicated upon accurate, complete etiologic diagnoses. Causation is never singular. Many factors are inevitably involved, some obvious and recent, others more obscure and in the past. The etiology of any disorder, whether it be a clinical entity or a vague syndrome, is usefully divided into three major groups of factors: (1) Predisposing factors, (2) Provoking factors, and (3) Perpetuating factors. These may be endogenous or exogenous, environmental, nutritional, traumatic, or infective. They may vary greatly in significance. It is possible (and highly desirable) to attempt some quantitative estimate of the relative weights of the various etiologic factors in any given case of impaired health. Some factors are amenable to correction, others (such as constitutional vulnerability, hereditary predisposing influences) are not so amenable. Effective prognostication is immensely facilitated by comprehensive, even though only approximate, analysis of probable etiology.

We can surely see that the whole is greater than the sum of its parts, for many of the parts react upon each other to create new forces and stresses. Clinical medicine is relatively helpless in rehabilitation and the reconstruction of health in the chronic senescent invalid without vigorous motivation for such recovery.[15] If society rejects the senescent and refuses him the opportunity to be useful, then drugs, physiotherapy, and surgery have lost most of their effectiveness.

There is an immense amount of work which must be done before the imperative and urgent problems of gerontology are solved. As yet we don't even know what all the questions are, let alone the answers! Though average longevity has increased dramatically over the last fifty years, largely because

of the reduction of deaths from the exogenous disorders of childhood, this advance is tainted by the terrible toll of prolonged disablement from the chronic progressive disorders of senescence. The time is not yet here when we may rest on our laurels and congratulate ourselves. By effectively solving the problems of epidemics of communicable infective diseases, medical science has contributed to creating the new and more complex and subtle problem of ill health in the years of later maturity. The primary responsibility, and thus also, the greatest privilege, rests with those of us concerned with geriatric medicine.

However, not all the responsibility can be placed on medical science and practice. Society as a whole has its portion. The senescent individual likewise can not shirk his share. No one can give health now or in the future. Like esteem, it must be earned by the efforts of the individual. It is the responsibility of senescents to seek guidance, take the initiative, and expend effort on their own behalf. Development of self-discipline as a part of maturation is essential. It is the responsibility of society as a whole to foster (financially and otherwise) research, education, and the development of facilities so that older people may help themselves. Finally, it is *our* task to advance knowledge by research (especially into methods of evaluating health and into the etiology of the degenerative disorders), energetically extend and improve education in matters of health, advise society of what needs to be done, and to apply by conscientious thoroughness in clinical practice the prophylactic as well as curative knowledge of geriatric medicine.

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Hyperthyroidism in the Aged*

A Review of 100 Cases Over 60 Years of Age

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TOXIC GOITER is not commonly found in the very young or the very old, but as one would expect with general increasing longevity the number of cases found in elderly people is also increasing. The data in this paper are based upon an analysis of two groups of patients with thyrotoxicosis; one operated on from 1925 to 1934; the other from 1938 to 1948 (Table 1). The second group is much the smaller. This reduction is

INCREASE IN INCIDENCE OF TOXIC GOITER IN THE AGED

	Age 10-59	Age 60 +	
	No. Cases	No. Cases	% Cases
1925-1934	818	62	7%
1938-1948	174	38	17.4%

TABLE 1

in part due to absence during the war, in part to the loss of a large charity practice, and in part also perhaps to the fact that goiter surgery with its present degree of perfection and safety is performed quite satisfactorily by any well trained general surgeon and is thus becoming much less concentrated in the hands of a few. Most of the first group was collected 20 years ago, and at that time only 7 per cent of the patients were over 60 years of age. In the second, more recent group, 17.4 per cent were over 60. The latter figure may be higher than actuality because with the present general low mortality for thyroidectomies, there is a tendency to refer only the elderly or poor risk patients to a supposedly more experienced surgeon. However, these figures are comparable to those of Young.[24] He reviewed 2,507 patients operated on for thyrotoxicosis in two hospitals in Duluth between the years 1926 and 1940 and found that three per cent were over 60 in 1926 compared to 12 per cent in 1940. This apparent increase of thyrotoxicosis in the aged is of course common to most diseases for there certainly are at present more old people capable of acquiring disease.

TABLE 2 shows the incidence of toxic nodular goiter and toxic diffuse goiter in 1092 patients according to age. Difficulty arises at times in sharply distinguishing between a toxic nodular and a toxic diffuse goiter. There are some goiters which have a diffuse hyperplasia engrafted upon a pre-existing nodular goiter. In this particular classification all thyrotoxic patients with

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	Toxic Diffuse Goiter		Toxic Nodular Goiter	
	No. Cases	Per Cent	No. Cases	Per Cent
10-19	47	6.3	2	.7
20-29	168	22.5	19	5.5
30-39	214	28.7	61	17.5
40-49	189	25.3	102	29.3
50-59	95	12.7	95	27.3
60-69	30	4.0	60	17.2
70	2	.3	8	2.3
TOTALS	745	68.2	347	31.8

TABLE 2

nodules in the thyroid gland were classed as toxic nodular goiter unless there was gross evidence of a diffuse hyperplàsia noted at the time of operation. As is well known, the incidence of toxic nodular goiter is much less than that of toxic diffuse goiter in the first two decades of life and then increases with the passing years until in the sixth decade of life the two diseases occur with equal frequency. Past the age of 60, toxic nodular goiter constitutes most of the cases, in this series 68 per cent. In Table 3 the cases

	TOXIC DIFFUSE GOITER				TOXIC NODULAR GOITER			
	—Females—		—Males—		—Females—		—Males—	
Age	No. Cases	Per Cent	No. Cases	Per Cent	No. Cases	Per Cent	No. Cases	Per Cent
10-19	40	85	7	15	1	.....	1	.....
20-29	137	81.6	31	18.4	18	94.5	1	5.5
30-39	168	78.5	46	21.5	55	90.1	6	9.9
40-49	149	78.9	40	21.1	94	92.1	8	7.9
50-59	65	68.4	30	31.6	81	85.3	14	14.7
60-69	21	70	9	30	52	86.6	8	13.4
70	1	.....	1	.....	6	75	2	25
Totals	581	78	164	22	307	88.5	40	11.5

TABLE 3

are broken down, in addition, according to sex. It is seen that although toxic goiter is much more common in the female than in the male there is a distinct tendency for the disease to appear relatively more frequently in the male during the latter years of life. The relative increased incidence in the older male is not great but it does exist being more statistically obvious in toxic diffuse goiter.

THE SYMPTOMS of hyperthyroidism are basically the same in young and old but as age increases certain differences do appear. The most marked change is the diminution in the degree of nervousness. The nervousness of hyperthyroidism is of an objective character, in that it can be seen by the observer's eye. A child with exophthalmic goiter is so exceedingly restless, so constantly on the move, that a diagnosis of chorea is not infrequently made. With each decade the "jitteriness," excessive motion, rapid speech and tremor diminish in intensity until not uncommonly in older age they are hardly noticeable. Levine[18] gave the name "masked hyperthyroidism" to a group of thyrotoxic patients in whom symptoms referable to the heart were so predominant that the underlying cause of the heart failure could easily be overlooked. This situation is found usually in older patients lacking

the characteristic hyperactive behaviour of the young. Lahey[17] used the term "apathetic thyroidism" to aptly describe the character of hyperthyroidism in a large group of patients of middle age or past. "Apathetic hyperthyroidism" could be called "senile hyperthyroidism" except that, although there is a tendency toward apathy with increasing age, by no means are all elderly people with hyperthyroidism apathetic. Some of them are as excitable as a sixteen-year-old.

The average basal metabolic rate in our group of patients was 44.8 per cent, the average duration of symptoms was 25.3 months and the average weight loss was 25.4 pounds. Although the average basal metabolic rate is about the same as in the young, in older people a slight elevation of basal metabolic rate is of more diagnostic significance. A basal metabolic rate of plus 25 in a young girl is, in itself, of little significance but one of plus 25 in a woman of 65 years of age usually has meaning. The average weight loss is not much greater than in younger individuals in spite of the fact that in the history of the symptoms in old people the loss of weight takes a more important place in the symptomatology.[7,21] Old patients have a loss of weight not infrequently associated with a poor appetite. It is very uncommon to see hyperthyroidism in a young person without a good if not excessive appetite. Actually, the loss of strength is a more striking symptom than the loss of weight but it is more difficult to measure. The duration of symptoms is longer than in the younger people. We did not expect any difference and did not calculate the duration of symptoms in the younger age group for accurate comparison.

TABLE 4 gives a list of associated diseases. A question mark is placed after hypertension; first, because it did not include an analysis of all the cases and

ASSOCIATED DISEASE IN 100 CASES OF TOXIC GOITER OVER 60

Hypertension	58%
Heart Failure	13
Diabetes	8
Psychosis (pre-operative)	2
Obstructive Dyspnea	2
Purulent Pericarditis	1
Pulmonary Infarction	1
Luetic Aortitis	1
Renal Stone	1
Carcinoma Sigmoid	1
Carcinoma Rectum	1
Pernicious Anemia	1
Asthma	1
Duodenal Ulcer	1
Cholecystitis	1

TABLE 4

second, because the calculation is at best only an estimate. If an individual with a blood pressure, for instance, of 200 mm. of mercury systolic and 100 diastolic develops hyperthyroidism, there is a tendency for both the systolic and diastolic pressures to drop, the tendency being more constant as regards the diastolic pressure, so that after the hyperthyroidism is well

established the systolic pressure is in the neighborhood of 185 and the diastolic pressure between 85 or even 80 and 75. A few months after a thyroidectomy has been performed the blood pressure returns to 200 systolic and 100 diastolic, or even higher. Thus one cannot, in many instances, determine whether or not a patient has hypertension until after the hyperthyroidism has been controlled.

Strangely enough, the exact converse of this phenomenon also occurs. Bisgard,[4,5] in a careful preoperative and postoperative check of the blood pressure in 35 hypertensive patients with thyrotoxicosis, found 7 patients who had high preoperative pressures and low postoperative blood pressures. Of these all but one, when examined postoperatively, had a sharp rise in blood pressure on exercise and after the cold pressor test, indicating that they had latent hypertension made more obvious by the associated hyperthyroidism. In addition, when an elderly individual with hypertension develops hyperthyroidism, the heart nearly always fibrillates and the determination of the systolic and diastolic pressures becomes more or less a guess. Reasonably reliable records were present in 77 cases. The average systolic pressure was 165 and the average diastolic 83.4. There were 9 patients who had a systolic pressure of 180 or over, 4 with diastolic pressures of 90 or over, and 20 with both. This group, constituting 43.4 per cent, most certainly had true hypertension. Bisgard believes that a systolic pressure of 170 indicates physiologic hypertension. There were 45 (58 per cent) with systolic pressures of 170 or over; this figure (58 per cent) is probably a close approximation to the incidence of hypertension in thyrotoxic patients over 60 years of age. Bisgard in his analysis found sustained hypertension in 8 per cent of a series of thyrotoxic patients of all ages and some evidence of hypertension in 25 to 30 per cent. He as well as Hurxthall[15] concluded that true hypertension in hyperthyroidism is purely coincidental.

Some authors[8,23] believe, on the contrary, that hypertension is found more commonly amongst hyperthyroid patients than normal population, especially in the older age groups, but our figures tend to contradict this opinion. Master and Simon,[19] using the criteria of a systolic level of 150 or more and a diastolic of 90 or more, found that between the age of 60 to 69 the incidence of hypertension in normal males was 47 per cent and in females 63 per cent. Their criteria in normal individuals are comparable to ours in thyrotoxic individuals and the incidence calculates out at approximately the same percentage.

The old heart gives way more easily than the young heart, and symptoms referable to heart failure often predominate. In this group heart failure was present in 14 per cent. The criteria used in determining heart failure was the usual shortness of breath on exertion plus persistent edema of the legs and/or ascites. Practically all the patients had more or less shortness of breath on exertion. It is almost a constant accompaniment of hyperthyroidism in the aged. Many more than 14 per cent had edema of the legs at bed

time after being up and about during the day, but only those in whom the edema was of marked degree or persisted throughout the day were considered to be decompensated. The result following thyroidectomy in patients with congestive heart failure is very gratifying but let there be no illusion that they are "as good as new." Too many of them die in four, five or six years of heart failure. Greene and Hurxthall[13] in a postoperative follow-up study of 469 thyrocardiacs found only one patient who had lived out his normal life expectancy and that those who died had lived only six years instead of a normal expectancy of 17 years.

Auricular fibrillation occurred either before or after the operation in 72 per cent. In over half of these it occurred as a transient irregularity postoperatively, lasting from a few hours to a few days. Auricular fibrillation in hyperthyroidism increases in incidence with each decade of life from a very small percentage in the young to a very high percentage in those past 60 years of age.[11] Indeed, as a diagnostic sign in the aged auricular fibrillation ranks next to an elevated basal metabolic rate. Anderson,[1] in a review of 426 toxic goiter patients with auricular fibrillation, found that the symptoms of hyperthyroidism were of greater severity and almost double the duration than of those patients without associated fibrillation. Ernstene[11] also found an increase in the duration of symptoms but he could find no correlation between the basal metabolic rate and the presence of auricular fibrillation. Both authors found that fibrillation occurred more frequently in toxic nodular goiter than toxic diffuse goiter and Anderson found a relative increase in normal expectancy in males over females. Fundamentally, however, auricular fibrillation in hyperthyroidism is a function of age regardless, to a large extent of the type of goiter, the severity of the disease or the duration of the symptoms. It is so common in older people that if after a thyroidectomy on a patient over 60 years of age at least temporary fibrillation does not occur, one is very dubious of the existence of hyperthyroidism. The height of the postoperative reaction is on the second postoperative night, and if a careful check is made it will be found that very few thyrotoxic patients over 60 years of age pass through the second postoperative night without an episode of irregularity of the heart.

Diabetes was found in 8 per cent. It was considered present if glycosuria was persistent or severe enough to require treatment with insulin. Following operation the glycosuria, of course, improved and most of the patients were able to maintain sugar-free urine by attention to the diet without the use of insulin. In other words, most of them were mild diabetics in whom the diabetes had been exaggerated by the hyperthyroidism. This probably explains in a great measure the increased incidence over normal population which Spiegelman and Marks[22] report as 1.5 per cent for males and 2.4 per cent for females between the ages of 65 to 74 years. Foster and Lowrie[12] reported 2.43 per cent of diabetics in 1607 patients of all ages operated on for hyperthyroidism and state that the highest incidence was in patients over

50 years of age. Lahey[16] in an analysis of 614 thyrocardiacs, 60 per cent of whom were over 50 years of age, found that 3.6 per cent were diabetic. There are then more hyperthyroid patients with sufficient glycosuria to require insulin therapy than in normal population.

It is peculiar that as age increases the incidence of exophthalmos in toxic diffuse goiter diminishes. Table 5 gives the incidence of exophthalmos in

DECREASE IN INCIDENCE OF EXOPHTHALMOS WITH AGE

Age	Cases Ex. Goiter	Number with Exophthalmos	Per Cent with Exophthalmos
10-19	41	28	68.3
20-29	143	87	60.1
30-39	174	104	59.8
40-49	164	97	59.6
50-59	78	36	46.2
60-69	19	5	26.3
70	1	1	

TABLE 5

true toxic diffuse of exophthalmic goiter according to age. Under "exophthalmos" are included those patients with definite stare with or without definite protrusion. A record of observations was available in only the first group of patients operated on between the years 1925 to 1934. All observations were noted by the senior author; the criteria for determining "exophthalmos" were uniform. The incidence drops from 68.3 per cent in the second decade to 26.3 per cent in the seventh decade of life. Crile, Jr.,[9] has likewise called attention to this alteration in the effect of hyperthyroidism in the aged. Since there is no known reason why exophthalmos occurs at any age, an explanation of why it occurs less in older people would certainly be a hypothetical interpretation of the unknown.

THE REMAINDER of the associated diseases consists of the usual conglomeration that one would find in a group of old people, all except coronary sclerosis which because of difficulties in diagnosis and the lack of routine electrocardiograms could not be estimated with any degree of accuracy and thence was omitted. Only a few of these are related in any way to goiter. Postoperative mental derangement is quite common and in some instances seems to be the chief factor in causing death. Pericarditis for some reason or other has a tendency to occur in thyrotoxicosis and auricular fibrillation occasionally produces emboli, sometimes to the lung and sometimes to the brain. Liver damage is not uncommon in thyrotoxicosis but Chesky,[6] in a careful study of liver function, reported that liver damage in toxic goiter is more closely related to the degree of thyroid dysfunction than to the clinical type of goiter or the age of the patient. Beaver and Pemberton,[3] from postmortem studies, concluded that chronic cirrhosis was more common in the older groups but that the acute lesions were not related to age.

If one analyzes the effects of thyrotoxicosis upon an individual throughout the life span, it will be seen that there is a definite progressive alteration through each decade of life from youth to senility. Indeed, it would seem

that the symptomatology in many respects can be related more accurately to age than to the type of goiter. Furthermore, it is apparent that symptoms often attributed to the type of goiter per se, such as the increased incidence of heart damage or auricular fibrillation in toxic nodular goiter, are purely a function of age and that many of the symptoms assumed to be more characteristic of toxic nodular goiter such as the infrequency of exophthalmos, the lessened degree of objective nervous excitability and the increased incidence of hypertension perhaps can at least, in part, be related to age. Crile, Jr.,[9] has stated the problem succinctly as follows, "Although clinical differences (between toxic diffuse and toxic nodular goiter) unquestionably exist, we believe that they are as much the result of the differences in the ages of the patients affected than as the result of any qualitative differences in the two diseases; that is, the disease is hyperthyroidism and its manifestations will vary more with the age of the patient it affects than with the type of goiter that is present."

TABLE 6 shows the death rate by decades. The influence of age on mortality is strikingly demonstrated by the fact that there was only one death in 511 thyroidectomies for toxic goiter on patients under 40 years of age and 13 deaths in the remaining 581 patients. In the hundred over 60 there were five deaths. In addition, one patient died of coronary sclerosis and pulmonary infarction during the third week of preoperative treatment making a total mortality of six per cent. In comparable age groups the following mortalities have been reported: Mora and Greene[20] 200 patients over 50 years of age—2.5 per cent; Young[24] 136 patients over 60—7.3 per cent; Clute[7] 145 patients over 60—2 per cent; Crile, Jr.,[10] 24 patients over 70—21 per cent; Mayo Clinic[24] 504 patients over 50—1.9 per cent; Hendrick[14] 72 patients over 60—5.5 per cent.

OPERATIVE DEATH RATE IN TOXIC GOITER BY DECADES

Age	No. Cases	No. Deaths	% Deaths
10-19	49	0	
20-29	187	1	0.2
30-39	275	0	
40-49	291	4	1.3
50-59	190	4	2.1
60-69	90	3	3.3
70	10	2	20.0
	1092	14	1.3

TABLE 6

The severity of the postoperative reaction following a thyroidectomy is about the same for the young and the old, but the elderly person just cannot tolerate as much abuse. A weak old lady will be troubled with as simple a thing as mucus in the throat, she will cough and cough to get it up, become exhausted, the mucus rattles back and forth in the trachea, breathing is impaired and trouble is at hand. Another one, perhaps on the day following operation without any excessive elevation of temperature or pulse rate,

becomes mentally confused, begins to thrash about in bed, becomes progressively unmanageable, slips into a semi-comatose restless delirium and dies in two or three days with a terminal hyperpyrexia and bronchopneumonia.

IN CONTEMPLATING treating a patient with hyperthyroidism at present, one must decide first whether to operate on the patient or try for a medical cure, and second, if an operation is to be performed, whether or not to prepare the patient with propylthiouracil. A thyroidectomy for toxic nodular goiter has always been a highly satisfactory procedure, results are excellent, the recurrence rate is very low. But a thyroidectomy for toxic diffuse goiter is not as satisfactory and carries a high recurrence rate, probably in the neighborhood of fifteen per cent. Thus, an attempt to cure toxic diffuse goiter by propylthiouracil and iodine therapy has some reasonable justification even to a surgeon. The immediate relapse rate after discontinuing medication is fairly high, in our own experience it has been close to 50 per cent. Further experience will undoubtedly lead to better methods which will reduce the incidence of immediate relapses. It seems fairly certain, however, that the recurrence rate over a period of years will be considerably higher than that following surgery. With a mortality of between five and ten per cent for thyroidectomy on patients over 60 years of age and a mortality of twenty per cent in those over 70, one might well consider the advisability of medical therapy alone. In the past it has been the custom among many physicians because of the increased mortality, to avoid or procrastinate operating on old people. This, we believe, is quite wrong. The older a patient is and the sicker he is the more necessary it is to use that therapeutic procedure which is most immediately and most certainly effective. The procrastination, which compounds the mortality rate, is often due to the thought contained in the statement of the relatives, "We thought mother was too old to have an operation." Since the permanency of medical cure is not established, it is best if a patient is old or very ill to prepare him for an operation and do it as soon as circumstances will permit. If the patient has a toxic diffuse goiter without much enlargement of the gland, the results of propylthiouracil therapy are more certain and more persistent; if the goiter is large or if the patient has a toxic nodular goiter, the results are not as good and operation has more definite indication. An old patient will not tolerate many months of continued hyperthyroidism nor will he tolerate many relapses.

That all elderly people should be prepared for operation with propylthiouracil is self evident. The mortality is normally high; the drug is marvelously effective in most cases. The method of treatment, well outlined by Bartels,[2] is the same for old and young. Propylthiouracil is administered in a dosage of 200 mg. daily. It can be given conveniently as 100 mg. twice daily. If not effective in this amount it can be increased fairly safely to as much as 600 mg. daily. A leucocyte count should be made weekly. If the count drops below 5,000 per cmm., it is mandatory to do a differential count or stop the administration of the drug. In most instances the differential count will show a nearly normal per cent of polymorphonuclear cells and

the treatment may cautiously be continued. Agranulocytopenia is uncommon but it does occur. A more common complication is a generalized pruritus or a generalized urticarial rash during the third week of treatment. It does not seem serious. If the drug is discontinued temporarily or reduced in amount the complication causes little trouble. In toxic diffuse goiter the addition of iodine, as five or ten drops of Lugol's solution twice daily, is definitely beneficial. In toxic nodular goiter it is of little help but does not harm, most certainly, however, it should be administered for two or three weeks preceding a contemplated operation. This regime is continued presumably until all the symptoms of hyperthyroidism have been alleviated. The length of time needed to obtain a normal basal metabolic rate varies from two or three months to six or nine months. There are no good criteria by which one can prophesy the expected duration of treatment. If the patient has a toxic diffuse goiter and is returned rather promptly to a euthyroid state and a medical cure seems reasonably possible, the treatment should be continued until a hypothyroid state is produced. The propylthiouracil may then be reduced to 100 mg. daily, after this a monthly check of the patient's general condition and blood count seems adequate. This regime should be continued for many more months, preferably up to one year. When the propylthiouracil is withdrawn the patient should be watched carefully for symptoms of recurrence, which not infrequently appear within a few weeks or months.

PREOPERATIVE treatment of hyperthyroidism in the aged with propylthiouracil will sharply reduce the mortality but it by no means eliminates it. We have treated only 12 patients over 60 years of age since the advent of the thiourea drugs. Of these, one could not take the drug (thiouracil) because of hyperpyrexia; one died in the hospital during the third week of preoperative treatment (propylthiouracil); one developed congestive heart failure with ascites twice during propylthiouracil therapy and we were forced to do a thyroidectomy; one had no improvement after two months of treatment and we were again forced to do a thyroidectomy in a hyperthyroid state. If we had had more confidence in the ultimate beneficial effect of treatment, as continued experience indicates usually does occur, and had persisted in it with the last patient for another month or two, we could very likely have produced an euthyroid state. One woman of 76 in a very poor general condition because of an exophthalmic goiter was treated for one year with thiouracil to the point of frank myxedema. She has been well for 18 months without further treatment. The remaining patients (seven) arrived in the operating room in such good condition that they seemed no worse than an ordinary non-toxic goiter.

SUMMARY AND CONCLUSIONS

1. The distribution by age, sex and type of goiter is analyzed in 1092 patients operated on for hyperthyroidism.
2. The symptomatology, associated diseases, and mortality are reviewed in 100 patients with hyperthyroidism over 60 years of age.

3. Hyperthyroidism in the aged is relatively uncommon but as with many diseases is now being found more frequently.
4. The symptoms differ chiefly in that the nervous excitability is less, exophthalmos is less frequent, heart failure is much more common and auricular fibrillation is very common.
5. It is believed that in most cases operation is the best method of treatment.
6. Preoperative preparation with propylthiouracil should be attempted in all aged patients.

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Health Outlook for Older People*

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THE PRIMARY objective of medical science is not the mere prolongation of life but the insurance of greater health, vigor, and usefulness until true senility creates infirmity. (Stieglitz.)

Because of the advances in medical science with the subsequent reduction particularly in infectious diseases and the decreased infant mortality rate, statistics show that each year brings the possibility of a longer life span. In 1940, 6.8 per cent of the population had reached 65 years of age. It is estimated that by 1980, 14.5 per cent of the population will be 65 or over.

Aging is a normal process which has been going on since birth. It is not a disease. It is true that biologic age and chronologic age are not necessarily the same and that different structures and systems of the body may age at different rates. We may see, for example, an older person with some degree of physical infirmity which has preceded mental senescence and we say that there is an old man with young ideas. The reverse can occur. In general, however, aging is a normal physiological process and should not be considered as an inevitable evil and precursor of death.

To understand the process of aging and thus have an intelligent approach to the care and understanding of the health problems of the aged, one must understand some of the physiologic changes occurring in the body. There are changes in practically all the organs of the body in that they become more dense and tend to become smaller. The exception is the heart which tends to remain unchanged in size providing there is no disease. Arteries and veins lose their elasticity.

The skin loses many of its capillaries which is frequently the reason for some degree of pallor noted in the older person. The skin loses its elasticity. Sweat glands are reduced in number. This, plus certain changes which go along in the smaller blood vessels and capillaries cause the older person to be unable to tolerate too much cold or hot weather comfortably. Bones become less dense and more fragile. Muscles of both the skeleton and the internal organs decrease in size and strength. There are certain changes that occur in the lungs which manifest themselves in the person's not being able to do as much exertion without getting short of breath.

As a result of the above-mentioned changes as well as some others, we note some decrease in pulse rate, a lessened ability of body tissues to utilize

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oxygen, digestive disturbances which frequently are due to loss of teeth or faulty dentures. Because of poor muscle tone and lessened physical activity, constipation is frequently found. There are sensory changes which in general are lessened and are of significance particularly as in the older patient disease may be overlooked. The response to pain is lessened. There may be psychological changes. These derive from the feeling of loneliness, of economic insecurity, of not being wanted, and the possible lack of the person's ability to perform useful work.

Aside from the normal changes which occur in the body with advancing years, it is important for the nurse and social worker to appreciate that there is also a change in response of the body to disease. It has already been noted that there is less response to pain so that, for example, an inflamed appendix may be overlooked until too late. A response to an infection in a younger person may give a fever of 104, but in the older person it may be only 99 or 100. There are cases of pneumonia reported in which there has been no cough, fever, or pleural pain. Cancer which in the older age group occurs most frequently in the stomach may give no signs or symptoms for a long time and then suddenly show up with symptoms of bowel obstruction which usually means the condition is far advanced and inoperable. It has been said that often in the aged the "organ suffers in silence." There is danger that vague complaints may be interpreted as just complaints accompanying older people. Such complaints may arise from environmental trouble, insecurity, lack of attention, etc., but on the other hand in view of the decrease in physiological functions, these complaints may be of significance. Evaluate carefully for the fear of retirement, the problem of family security, etc., may cause them to hide their complaints.

There is also a change in the body to the response of drugs. This change in the response to drugs is for the most part due to the slower absorption and/or slower excretion of the drug. The ability of the body to detoxify the drug may also be lessened. The result of these changes may mean an accumulative effect and toxic symptoms which are obtained with that which is ordinarily considered as a normal dose. For example, one has to be careful in the administration of digitalis and morphine in the aged. There is a decrease in alcohol tolerance. Sulphones may be apt to decrease the amount of oxygen which the blood carries; if kidney trouble is present, this may be aggravated. Drastic cathartics may yield dehydration to a dangerous degree. The action of insulin in a diabetic often is less prompt and less effective, but carries the compensation that there is less likelihood of a reaction.

As WE ALL know, sooner or later we all will depart from this world. What are the main causes for precipitating this departure? I will mention a few of the conditions which take the majority of us. It might be added here that, unfortunately, to die of old age is the exception rather than the rule. The greatest cause of death by far is due to what has been termed the degenerative diseases. These include all forms of arteriosclerosis, heart disease and high

blood pressure which are associated with the older age group. The cause of these degenerative changes is unknown, thus, there is no specific cure and these changes rank first on the list. There is, however, much medical science knows concerning the behavior of these conditions and there is much that can be done to combat the incapacities which these conditions produce. In general, life should be so regulated that activity is not associated with strain; rest should be adequate; an attempt should be made to reduce anxieties and worries. It is important that obesity should be reduced or not permitted to occur. Overweight produces added strain on heart, and prevention of obesity over 30 years of age is a prophylactic imperative—a must in preventive geriatrics. It is better done by diet than by drugs.

Special diets of various kinds have been proposed for hypertension as well as heart failure. A low salt diet is a necessity in heart failure but yet of questionable practical value in hypertension. Diet in general should be well balanced. Meat in general and in proportion is to be desired. More specific medication is the province of the physician and these types of patients should be followed on the average of monthly intervals.

The next highest cause of death is cancer. Although we again do not know the cause, an effective cure may be obtained and is obtained by early diagnosis. This may, as we have mentioned before, be somewhat of a problem in the aged, but the answer is periodic health checks. There is already established throughout the city and state centers where one can go for such a check-up. Actually anyone who has reached the age of 60 or more should have a check every six months whether there are complaints or not.

Pneumonia and tuberculosis are in 6th and 7th place respectively. These two conditions are bound to fall lower and lower in the scale as new chemicals and anti-biotics are found so that the problem here in the main is one of prevention and personal hygiene.

DIABETES HAS gone from 27th place in 1900 to 9th place at present. We find diabetes with increasing frequency over the age of 60 years, although there are fewer chances of developing diabetes after the age of 60 years. The greatest incidence is between years of 50 to 60. This condition may be overlooked as in this age group diabetes has a slow and insidious onset. As a rule the type of diabetes is mild and relatively easy to manage medically even though the action of insulin is less prompt. One should avoid sudden changes in the treatment regimen in these older people concerning the diet and amount of insulin given. Actually, the discovery of diabetes is often a blessing as a well-balanced and varied diet plus insulin if necessary makes the patient have a feeling of well-being and an increased feeling of strength. Life expectancy with the care available today is just as good with the general population.

Although people in the older age groups do not die of arthritis, this condition is frequently a complicating factor in their daily lives and hinders them from being useful and happy people. Infectious arthritis which is the crippling type of arthritis usually has its onset before 40 years, but its effect

is particularly noted by the older person. Here it is important, particularly in the preparation for growing older, that one avoids as far as possible upper respiratory infection, is careful to have any foci of infection corrected or removed, and to have adequate orthopedic observation. It is frequently possible by orthopedic correction to reduce or improve crippling deformity. Ordinary methods of physiotherapy are often beneficial, heat and massage. Treatment by gold salts, best of the drugs so far, is reserved for the active cases and should have strict supervision by the attending physician. So-called hypertrophic arthritis is the type of arthritis which occurs after the age of 40. This is not deforming but can be somewhat incapacitating with pain and moderate swelling of usually the larger (weight bearing) joints. Many of these patients are overweight, and it is of prime importance that weight be reduced to remove the strain from the involved joints. Proper shoeing, physiotherapy, symptomatic treatment for pain, and reassurance usually produce quite favorable results.

In general, the health outlook for the older person depends upon the care they take of themselves in younger years as well as in the older years. Chronic diseases that have been acquired should have adequate medical attention. One of the things that I dislike to see is the older person going around being bothered with a truss to support a hernia which has been there for years. This could have been corrected earlier with good results by surgery. Prostatic troubles are often avoidable by proper management. In women pelvic complaints are often the result of damage to the pelvic organs through childbirth, and which are certainly correctible. In fact, even in the older person medical science has reached such a point that an operation is now performed with a minimum of risk to the patient. The main point is early ambulation following surgery.

In a broad sense the life of an older patient should be one of moderation. It is dangerous for him to overeat or overdrink. The diet should be varied to avoid avitiminosis and to supply protein. Supplemental vitamins are not necessarily needed unless there are indications. Alcohol is often of value to these older people as it may act as a mild stimulant as well as a food. Of course, moderation is the rule. Benjamin Franklin has said that in his time there were more old drunks around than old doctors. One should not expect too much from medication in the aged, and when treating an illness the treatment and care of the person is more important most of the time than the treatment of the illness. The most important form of therapy is that of sympathy and kindness.

In concluding I should like again to stress that before persons reach senility, they should be educated to realize the gradual changes that are to take place and to appreciate the certain limitations of their capacities during old age. If this is done, their opportunity for greater health, vigor and usefulness is greatly augmented.

A Study of the Electrocardiogram in Persons Over Seventy

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INTEREST in the problems relating to senescence has increased greatly in recent years as a result of the increasing elderly population. The higher incidence and growing importance of the degenerative diseases probably can be accounted for on the basis of the population factor. In this group of diseases those of the cardiovascular system take first place. For this reason the electrocardiogram of the elderly person warrants further study and investigation.

Aging is a continuous process from conception to death. It has been defined as those changes which are introduced by the factor of time in living. McCay,[1] in a discussion of its chemical aspects, concluded that almost nothing is known of the biochemistry of aging. Warthin[2] presented the thesis that senescence is a normal physiologic process and referred to aging as "the major involution." He considered that growth and retrogression are associated in the development of the organism and compared the local changes in the umbilical cord, ductus arteriosus and thymus occurring in embryonic, fetal and post-uterine life to the general involutionary changes occurring in senility. The local involutions of the growth period and those during senescence bear a common histologic resemblance characterized by fibrosis, atrophy and vascular deterioration; furthermore, each may be considered to be a result of fulfillment of function, the main differences between them being those of degree, purpose and the organs involved. Warthin further considered death as normal or biologic when it resulted from involutionary changes alone and stated that in his pathologic experience he had not seen more than twenty-five such cases. He regarded myocardial atrophy and inadequacy as the most probable natural terminal lesion.

The physiologic tissue changes of normal aging are outlined by Carlson[3] as follows:

1. Gradual tissue desiccation.
2. Gradual retardation of cell division, capacity of cell growth and tissue repair.
3. Gradual retardation in the rate of tissue oxidation (lowering of the basal metabolic rate).
4. Cellular atrophy, degeneration, increased cell pigmentation and fatty infiltration.
5. Gradual decrease in tissue elasticity and degenerative changes in the elastic connective tissue.

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6. Decreased speed, strength and endurance of skeleto-neuromuscular reactions.
7. Decreased strength of skeletal muscle.
8. Progressive degeneration and atrophy of the nervous system, impaired vision, hearing, attention, memory and mental endurance.

Aging of the myocardium is termed presbycardia by Dock[4] who states that it seems to be an important factor in the failing heart of persons of middle age and older. The word is used to indicate that age has altered the functional ability of the heart even though no significant structural change is apparent.

THE QUESTION of normality in old age has been the subject of considerable discussion. Cohn[1] presents the view that normality may be based upon the average findings in a group and that abnormality consists in the rare departure from these findings. According to this viewpoint the cardiovascular system in old age may be considered normal if the anatomic changes are those usually found or anticipated in this age group. In a postmortem study of 381 cases in which the subjects were aged 70 years or more, Willius and Smith[5] found moderate to advanced coronary atherosclerosis in 75.5 per cent. In only 2.5 per cent were changes in the coronary arteries scarcely perceptible. These findings emphasize the high incidence of vascular lesions and associated degenerative changes in old people and indicate the importance of the coronary circulation in the question of the aging heart. For clinical purposes it seems preferable to consider such findings abnormal in old age as in middle or younger life and to maintain a single standard of normality for adults of all ages. Old age is not a disease but those in old age have simply had a longer opportunity to develop disease.

Chamberlain and Hay[6] examined 302 persons to determine the variation of the electrocardiogram with age. The series consisted of normal subjects in the first to seventh decade of life, inclusive. Age differences were not great. The amplitude of Q waves showed a slight increase in the later decades, while R waves and T waves became smaller. No appreciable difference in P-R and QRS time intervals was found between the earlier and later decades.

COMMON physiologic conditions in persons of advanced age, as they relate to the cardiovascular system are, according to some observers, a more horizontal position of the heart, a lower pulse rate, an increased frequency of irregularities of rhythm, valvular fibrosis and rigidity, an increased systolic blood pressure and atrophy of the myocardium in the absence of hypertension or aortic valve disease. Russek and Zohman,[7] in an analysis of blood pressure levels in 3,691 male subjects between the ages of 60 and 95 years, found that the average systolic blood pressure increases with age so that less than one-half of the number of persons 60 years old or older had normal blood pressure (149 systolic and 95 diastolic, or less).

CHANGES in the electrocardiographic scheme of persons of old age have been described a number of times but there has been no agreement as to the frequency of abnormal records among such individuals. Sprague[8] expresses the opinion that it is unlikely that the ordinary senescent changes of aging in the heart are responsible for electrocardiographic abnormalities. This would seem to be borne out by the case cited by Gelman and Pusik,[9] that of a Russian farmer 122 years of age with normal blood pressure and without evidence of cardiac enlargement on physical examination, whose electrocardiogram revealed a sinus bradycardia, P-R 0.20 second, QRS .10 second, small but positive T waves in all leads, left axis deviation and slurring of R waves in all leads. Katz[10] and associates reported the electrocardiographic findings in 3 cases of brown atrophy of the heart, the atrophy in each case involving all parts of the heart uniformly. The electrocardiograms were within normal limits and all demonstrated left axis deviation.

Willius,[11] in a study of the records of all patients between the ages of 75 and 96 who underwent electrocardiographic examination at the Mayo Clinic between 1914 and 1930, found that of the 700 cases contained in the series, 45 per cent were without clinical evidence of heart disease. The electrocardiograms of the patients in this group did not show significant abnormalities (premature contractions were found in 34 per cent). Of the remaining 55 per cent, i.e., those who did show evidence of heart disease, 54.5 per cent showed electrocardiographic abnormalities.

Jensen, Smith and Cartwright[12] selected 50 individuals between the ages of 50 and 65 in order to study the normal electrocardiogram for persons in this age group, also to determine whether or not there are physiologic changes associated with this period of life. The cardiac history and examination were normal, the blood pressure did not exceed 150 mm. of mercury systolic and 90 mm. diastolic, and six-foot chest films showed the heart measurements to be normal. All electrocardiograms in this series were found to be within normal limits. These investigators found no characteristic age change in the electrocardiogram for persons in this age group.

GELMAN AND BROWN[13] report an electrocardiographic investigation of 60 "normal" persons aged 61 and over, of which number 3 were over 100 years of age. Their cases were selected for the most part from old age homes and were free from heart complaints or manifest evidence of degenerative disease. Their study was made for the purpose of comparing the electrocardiogram in old people with that of healthy school children aged 12 to 14 years. In an analysis of their findings in the aged group regarding conduction defects and aberrations of contour of the electrocardiogram, 30 per cent had abnormal records (P-R and QRS prolonged in 3 per cent and 11 per cent respectively, negative T waves in all leads or in leads I or II in 16 per cent). Slurring and notching of QRS in all leads occurred in an additional 6 per cent.

Duthoit, Warembourg and Pinchart[14] made an electrocardiographic study of 116 persons between the ages of 60 and 88, the majority of whom were occupants of a home for the aged. These individuals apparently were in good

health and free from past history of cardiovascular disease, rheumatic fever and syphilis. Each person was examined clinically and roentgenologically, although these aspects of the study were not included in the report. In this series of cases only 3 electrocardiograms were considered to be normal.

Lohr and Tillmanns[15] report the result of an analysis of 162 cases between the ages of 51 and 90, of which 59 per cent had normal electrocardiograms. Of those over the age of 70, 50 per cent had normal electrocardiograms. Of the entire series of 162 cases, 42 had a systolic blood pressure exceeding 160 mm. of mercury, and of this group 50 per cent had normal electrocardiograms.

Warnecke[16] studied 70 cases of apparently healthy persons between the ages of 65 and 88. The cases were selected on the basis of a negative history and a normal physical examination and the electrocardiograms were classified as those demonstrating slight, marked and severe pathologic changes. Abnormal electrocardiograms were present in 41 cases, or 59 per cent. The majority (36 per cent) of the abnormal electrocardiograms revealed changes considered slightly abnormal such as "conduction disturbance of a minor degree." In 17 per cent the abnormal findings were classified as marked, consisting of S-T segment and T wave changes. In 6 per cent the changes were severe, with evidence of bundle branch block, auricular fibrillation and possible old myocardial infarction.

Levitt[17] presented the results of studies of 100 carefully selected men and women over the age of 70 years with apparently normal hearts. His criteria for an abnormal electrocardiogram did not include auricular fibrillation and alterations of the P-R interval. Twenty-six per cent of these cases revealed abnormalities of the electrocardiogram consisting of S-T segment deviation, T wave changes in leads I or II or both, and prolongation of QRS beyond 0.1 second.

Eliaser and Kondo[18] evaluated 100 electrocardiograms of persons over the age of 70 with the idea in view of determining the normal electrocardiographic scheme for an elderly person without symptoms of cardiovascular disease. Their cases were selected from among ambulatory persons in an institution for the aged and were chosen on the basis of a negative cardiovascular history and normal physical examination, including the absence of hypertension (blood pressure not exceeding 150 mm. of mercury systolic or 90 mm. diastolic). They found but 15 per cent of the group to have normal electrocardiograms. Included in their criteria of abnormality was left axis deviation. These investigators concluded that for persons over the age of 70 left axis deviation, low voltage, A-V conduction in excess of 0.2 second and inverted T waves in any or all leads may be considered as being normal.

Fox, Klements and Mandel[19] studied the electrocardiograms of 300 men and women between the ages of 60 and 100, admitted to a home for the aged for social and economic reasons. Cases were included in the study if they were ambulatory. Repeated clinical observations were made in all cases and cardiac size was determined by fluoroscopy. Hypertension was present in 77

per cent and evidence of cardiac enlargement (by fluoroscopy) in 62 per cent of cases. There were 100 normal tracings and 200 abnormal ones in the entire series. In 40 cases the heart was of normal size, the blood pressure was normal and of these, 55 per cent had abnormal electrocardiograms. These observers concluded that cardiac enlargement seemed more definitely correlated to an abnormal electrocardiogram than did hypertension and that the incidence of abnormal electrocardiograms increases with age.

Taran and Kaye[20] studied electrocardiographically 102 persons between 60 and 90 years of age, inmates of a home for the aged. All individuals were ambulatory and the cases were chosen for study on the basis of freedom from symptoms or history of heart disease. Conduction disturbances were found in 17.6 per cent of cases, evidence of myocardial damage in 46.5 per cent (all cases in which there was hypertension and marked left ventricular strain were excluded from the latter group), making a total of 64.1 per cent abnormal records in the series.

Fox, Weaver and Francis[21] examined 300 males between the ages of 60 and 90, inmates of a farm colony. Fluoroscopic evidence of enlargement of the heart was present in 52 per cent and hypertension in 61 per cent. Abnormal electrocardiograms were found in 49.4 per cent of cases in this group. These observers concluded that the abnormal electrocardiogram was a manifestation of diastolic hypertension, cardiac enlargement and age.

As indicated in table 1, abnormal electrocardiograms have been found in a widely varying proportion of apparently normal elderly persons. These results probably can be accounted for on the basis of differing purposes of study and criteria in selection of case material, as well as variations in opinion as to the limits of normality of the electrocardiogram in aged persons.

Series	Number of Cases	Age Group	Per Cent Abnormal EKG
Willius	700	75- 96	54.5
Jensen, Smith & Cartwright	50	50- 65	0.
Gelman & Brown	60	61-100	30.
Duthoit, Warembourg & Pinchart	116	60- 88	98.
Lohr & Tillmanns	162	51- 90	41.
Warnecke	70	65- 88	59.
Levitt	100	70 & over	26.
Eliaser & Kondo	100	70 & over	85.
Fox, Klements & Mandel	300	60-100	66.
Taran & Kaye	102	60- 90	64.
Fox, Weaver & Francis	300	60- 90	49.
	2,060	50-100	52.

TABLE 1

The experience of the preceding investigators confirms the influence of cardiac enlargement and hypertension on the electrocardiogram. In the presence of either condition, an abnormal electrocardiogram is not surprising. In the present series, therefore, an attempt was made to determine the incidence of the abnormal electrocardiogram in elderly persons in whom cardiac enlargement and hypertension were absent and cases were selected for study

which were presumably normal from a cardiac standpoint by all standards except electrocardiographic. The series was comprised of men and women 70 years of age and over who were receiving no cardiac medication and who were without significant symptoms of a cardiorespiratory nature. Auscultation in each case revealed no diastolic murmurs and no systolic murmurs of more than faint or moderate intensity. The blood pressure was obtained at 160 mm. of mercury systolic and 90 mm. of mercury diastolic or under in each individual. A teleoroentgenogram in all cases showed the heart to be within normal limits of size (cardiac diameter not over one-half of the internal transverse thoracic diameter). Most of the subjects experienced some shortness of breath on more than moderate exertion, and many gave a history of intermittent cough; however, these symptoms had never interfered with their activity and were not considered disqualifying. None gave a history of substernal effort pain or of previous severe chest pain suggestive of coronary occlusion.

Cases demonstrating roentgen ray evidence of aortic elongation and widening, unless extreme, were accepted. The Kahn or Mazzini test, performed in all but a few cases, was negative in each instance. The majority of the persons studied were ambulatory outpatients; the hospitalized patients had been ambulatory up to or shortly before their hospitalization for reasons not related to the cardiovascular system. The causes of the various presenting complaints are listed in table 2.

Trauma	23	Carcinoma	8
Gastrointestinal	15	Miscellaneous (hernia, cystocele, dermatitis)	8
Prostatic hyperplasia	13	Bone & joint	2
Central nervous system (vertigo, tinnitus, deafness)	10	Diabetes	2
Respiratory infections	9	Pernicious anemia	1
No complaint	9		

TABLE 2

As will be noted in table 2, two cases of diabetes were included; the diabetes was of mild degree and the electrocardiogram in each case was normal. One case of pernicious anemia was included, also with a normal electrocardiogram. Nine subjects were without symptoms and submitted to examination on request. Cases conforming to the foregoing clinical and

Age Group	70-75		76-80		81-85		86-90		Total
Males	43		23		11		1		78
Females	18		3		1		0		22
Total	61		26		12		1		100
	M	F	M	F	M	F	M	F	
Normal	17	11	6	1	4	0	0	0	39
Minor abnormalities	15	4	6	1	3	1	1	0	31
Abnormal	11	3	12	0	3	1	0	0	30

TABLE 3

roentgenologic standards were included in the series consecutively to the number of 100. There were 78 males and 22 females (a ratio of approximately 3½:1) which are divided according to age in table 3.

All electrocardiograms were made with the patient in the supine position and analysis of the series was based on the three standard leads and the precordial lead CF_4. The criteria of a normal electrocardiogram are not fixed and in recent years have tended to become more liberal. The criteria used in this study are given in table 4; they conform in important particulars to recent authoritative sources.[22, 23, 24]

ELECTROCARDIOGRAPHIC CRITERIA

LIMB LEADS

P Wave
- Direction: Upright in leads I and II.
- Amplitude: 0.5 to 2.5 mm. in lead in which the voltage is highest. Low voltage of P wave present when voltage less than 0.5 mm. in all leads.
- Duration: Up to and including 0.1 second.
- Contour: Abnormal in lead I or II if diphasic, inverted or grossly notched.

P-R Interval: 0.12 to 0.20 second.

QRS Complex
- Duration: Not exceeding 0.10 second in lead where longest.
- Amplitude: Voltage regarded as low when the largest QRS deflection in either direction from the base line in any limb lead does not exceed 5. mm.
- Contour: Slurring, notching or splintering appearing in two leads and in one of these nearer the peak than the base of QRS, is considered abnormal. Q wave abnormal if 25 per cent or more of R in leads I or II and 50 per cent or more of R in lead III.
- Axis: Net deflection is upward or zero in standard leads (when QRS of normal duration).

S-T Junction: Deviation from isoelectric level up to plus-minus 1. mm. considered normal.

T Wave
- Direction: Upright in leads I and II.
- Amplitude: At least 1. mm. in leads I and II.

PRECORDIAL LEAD CF_4

P Wave: May be zero or normally inverted if less than 1.5 mm. in amplitude.

QRS Complex
- Amplitude: Over-all dimension (R plus S) of 8. mm. or more. Initial positive deflection (R) not less than 3. mm. Initial negative deflection (Q) not more than 3. mm.

S-T Junction: Any depression below isoelectric level is abnormal, or elevation greater than 2.0 mm.

T Wave
- Direction: Upright.
- Amplitude: 0.5 mm. to 13.0 mm.

TABLE 4

The records were divided into normal and abnormal electrocardiograms, the latter group being subdivided into those showing only a minor change of questionable significance (low voltage, premature contractions, notched P waves, sinus arrhythmia), and those demonstrating definitely abnormal changes such as prolonged conduction time, anomalies of the QRS complex, S-T segment and T wave. These are listed in table 5.

No instances of auricular fibrillation or right axis deviation occurred. Left axis deviation was considered normal and 42 per cent of the records demonstrated this change. This is the most common alteration in the electrocardiogram of later life, its incidence being previously reported in from 52 per cent[13] to 75 per cent[20] of cases. The significance of marked left axis deviation in which S_2 is of greater amplitude than R_2 is unsettled. Katz[23] interprets this type of record as definitely abnormal when S_2 is 50 per cent or more of R_2. Faulkner and Duncan[25] investigated 200 cases demonstrating this variation and concluded that in an otherwise normal electrocardiogram it

is to be regarded as a normal variation, that it is encountered with increasing frequency with advancing years but that it could not be correlated with ventricular enlargement, coronary or myocardial disease. In the present series a deep S_2-S_3 pattern with otherwise normal contour is considered as being within normal limits. Only 5 such records occurred; the finding was associated with abnormalities in 8 additional instances.

STANDARD LEADS

	Per Cent
Minor Abnormalities	
Sinus arrhythmia	1
Low voltage of QRS complex in standard leads	12
Premature contractions	28
Notched P waves	5
Major Abnormalities	
P-R interval prolonged (1st degree A-V block)	3
Prolonged I. V. conduction	6
Right bundle branch block ("S" type) 3	
Left bundle branch block (common type) 2	
Concordant upright type 1	
Deep Q_3	3
Notched QRS complex	1
S-T segment depression	5
S-T_1-2	
S-$T_{2\,3}$-3	
Low amplitude or inversion T waves	15
T_1 -9	
$T_{1\,2}$ -1	
$T_{2\,3}$ -4	
T_3 (with Q_3) -1	
Precordial Lead CF_4	
Low voltage	1
Q_4	3
S-T depression	3
T inversion	2
High T_4	2

TABLE 5

The heart rate in all but 5 cases was between 60 and 100. One case revealed a sinus tachycardia (107) and 4 cases sinus bradycardia (46, 50, 56, 58). These findings per se, in the absence of other changes, were not considered abnormal. Sinus arrhythmia was found in one case and was classified as a minor abnormality.

The voltage of the QRS complex was low in 12 cases. It has been previously reported low by others in from 2 per cent[12] to 37 per cent[18] of cases studied.

Ectopic beats occurred in 28 cases, the ventricular type predominating slightly over the auricular. No nodal premature contractions were found. Premature contractions have been found to occur in the electrocardiograms of old people in percentages ranging from 8.7[20] to 33.,[11] the average incidence being approximately 20 per cent.[11,17,18,19,20]

P wave changes were not frequent. Several records showed the duration of the P wave to be 0.1 second but none exceeded it. Notching was considered

abnormal only if obvious to the naked eye; 5 records demonstrated this. No instances of P wave inversion or low voltage were encountered.

The P-R interval was prolonged in three instances being 0.22 second in each case. Increased duration of A-V conduction has been reported in as high as 40 per cent[18] of cases, but the more commonly quoted range is from 1.9 per cent[20] to 13. per cent.[19]

The QRS complex was found to be of abnormal duration in 6 cases, the "S" or right bundle branch type of intraventricular block in 3, the common type of left bundle branch block in 2, and the concordant upright type in one. Delayed intraventricular conduction (QRS interval over 0.1 second) has been reported in from 1.9 per cent to 24. per cent of cases. The average incidence in four large series[11,13,17,19] of cases of aged persons is 10.3 per cent.

Deep Q waves in the standard leads were infrequent, being found only in Lead III and in but 3 cases. Q wave abnormalities (in the limb leads) have been reported in 6 per cent[18,19] of cases.

NOTCHING or slurring of QRS was considered abnormal only if occurring in at least two leads and to a marked degree. Such an abnormality was noted in but one case. This is a change subject to considerable personal variation in interpretation. It occurred in 6 per cent[13] and 8.6 per cent[19] of cases in two previously reported series.

S-T segment deviation occurred in 5 cases with depression of $S\text{-}T_2$ and $S\text{-}T_3$ in three instances and of $S\text{-}T_1$ in two cases. No records of S-T elevation were found. Deviation of the S-T segment in one or more leads has been reported to occur in 7.8[20] to 21 per cent[19] of cases, downward displacement being much commoner than elevation.

Low or inverted T waves occurred in 15 cases involving lead I in 9 instances, leads I and II in 1 instance, leads II and III in 4, and lead III in 1 (with a deep Q_3). T wave abnormalities were found to be the most frequent electrocardiographic abnormality in the series of Willius[11] and these occurred predominantly in lead I. The incidence of T wave changes ranges from 14 per cent[17] to 33.6 per cent,[19] the average of six[11,13,17,18,19,20] reported series being approximately 24 per cent.

Abnormalities in the precordial lead CF_4 occurred eleven times. These consisted of a deep Q three times, S-T depression three times, T wave abnormalities four times and low voltage of RS_4 once.

Normal electrocardiograms were found in 39 cases in the series. Records demonstrating only minor abnormalities constituted 31 cases. Definitely abnormal electrocardiograms occurred in 30 cases.

COMMENT

The most common abnormalities were premature contractions, T wave changes (low amplitude or inversion), low voltage of QRS complex and prolongation of intraventricular conduction.

While premature contractions and low voltage are structurally abnormal, they do not constitute sufficient evidence to warrant an opinion of myocardial

disease and may, for practical purposes, be considered with the normal group. If the electrocardiograms showing these changes are added to those of the normal group, 70 per cent of the electrocardiograms in this series were found to be without significant abnormality.

This relatively large number of normal electrocardiograms is noteworthy in view of the high incidence of coronary atherosclerosis after the age of 70.

In a necropsy study of 355 cases, Blumgart, Schlesinger and Zoll[26] found that 10 per cent revealed complete occlusion and an additional 9 per cent considerable narrowing of one or more coronary arteries without giving rise to cardiovascular symptoms or signs and in those cases in which electrocardiograms were available, the complexes were normal. These investigators demonstrated a collateral circulation in relation to the obstruction in each of the hearts studied by injection of the coronary arteries with radiopaque material. The existence of such a collateral circulation probably accounts for many of the normal electrocardiograms in the present series.

Also of interest is the occurrence of abnormal electrocardiograms in almost one-third of the cases, without clinical evidence of myocardial disease by symptom or sign.

THERE was an increase in electrocardiographic abnormality with increase in age in the second half of the eighth decade. In the 70- to 75-year group the ratio of normal to abnormal electrocardiograms was 2:1 but in the 76- to 80-year group, the ratio was reversed, 12 abnormal records being found to 7 normal ones. This trend, however, did not continue in the group of cases of persons over 80 years of age, in which there were more than twice as many essentially normal as abnormal electrocardiograms. Willius[11] observed a decreased occurrence of T wave negativity after the eightieth year and, after the eighty-fourth year, no such instances were found in the oldest 27 patients in his group. Taran and Kaye[20] also found that while the incidence of abnormal electrocardiograms increased in the 70- to 79-year group as compared with the 60- to 69-year group, the lowest percentage of electrocardiographic evidence of myocardial damage in their series of cases occurred in the group of persons over 80 years of age.

The evidence also indicated a higher incidence of abnormal tracings among males (table 3). Abnormal electrocardiograms occurred among 18.1 per cent of the female subjects and in 33.3 per cent of the males.

SUMMARY

In a group of 100 persons 70 years of age and over, with a predominance of males, selected on a basis of freedom from cardiorespiratory symptoms and absence of cardiac enlargement and hypertension, abnormal electrocardiograms were found in approximately one-third (30 per cent). Another third (31 per cent) revealed only minor changes of indefinite significance, such as premature contractions, low voltage or P wave irregularity, and one-third (39 per cent) had electrocardiograms which were normal.

The most common abnormalities were premature contractions, T wave changes, low voltage of the QRS complex and intraventricular conduction defects.

There was an increasing occurrence of electrocardiographic abnormality with increasing age in the second half of the eighth decade but essentially normal electrocardiograms outnumbered abnormal ones in persons over 80 years of age.

A higher incidence of abnormal electrocardiograms was found among males.

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Problems in Gastrointestinal Surgery as Affected by Advanced Age*

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ADVANCING YEARS should not deprive a patient with an otherwise curable disease of the gastrointestinal tract of the opportunity to benefit by surgery. Such an attitude is occasionally coupled with a higher unavoidable morbidity or mortality than is likely when treating younger patients. Only by anticipation of the many possible complications which beset patients with gastrointestinal disease can the attitude above be justified. Meticulous observation of basic principles of care in the pre and postoperative period as well as at the operating table is essential to keep both mortality and morbidity low.

IN GENERAL, two basic principles underlie all the surgical care directed toward the aged. First, the rate of healing slows as age advances; and second, complications which appear to be either minor or which are unrecognized in younger patients may be very disastrous to the aged patient.

When operations are done which involve reconstruction or removal of a portion of the gastrointestinal tract, the slow rate of healing tends to allow many of the minor complications which result from any operation to develop into major ones. All possible complications must be anticipated in the preoperative period in order to effectively avoid them; careful attention to technical details must be observed during the operation, particularly to minimize the likelihood of a leak after operation, and postoperative care must be of the highest caliber in order to help the patient recover from an operation, to prevent the development of any impending complications and to assist him in the recovery from complications that develop in spite of our efforts.

PREOPERATIVE CARE

In the preoperative care of patients on whom gastrointestinal surgery is anticipated, the systemic care is of as much significance as is the local care of the gastrointestinal tract. Suffice it to say that these patients should have no concomitant disease not under fairly adequate control, i.e., diabetes. The continued attention of the internist and often of the urologist are almost minimal requirements. Since pulmonary, genito-urinary and vascular com-

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plications are the three types most likely to upset the postoperative course of these patients, these must be especially anticipated by the following measures:

PULMONARY

1. *Oral hygiene* should be adjusted as accurately as possible. Carious teeth, if not extractable, should be carefully cleansed, especially so that no easily removable debris is present in the mouth at the time of surgical intervention. Mouth wash with O_2 producing drugs should be used preoperatively. When bronchiectasis or chronic bronchitis exists, complete emptying of the tracheobronchial areas must be carefully attempted, either by postural drainage, by coughing, or if necessary by bronchoscopic aspiration. These patients may often be in such condition that little can be done of a local nature to improve the disease, but both of these conditions as well as dental caries may be rendered less dangerous by prophylaxis in the immediate (24 hour) preoperative period. The intravenous use of sodium cacodylate usually has a specific effect upon the spirochetes of Vincent's organisms. This organism is common in the mouth, and may produce gangrenous changes in the lung should it be present in large numbers in any retained mucous secretion. It is felt by some that the preoperative use of penicillin either by inhalation in aerosol or parenterally is also of prophylactic value in preventing pulmonary complications.

2. *Urologic complications.* Of particular importance in this field is the tendency for older men to have unrecognized prostatic disease with mild to moderate bladder retention which is relatively asymptomatic. Often simple bed rest will precipitate a retention which, if treated incorrectly, may be followed by a whole series of urologic catastrophes. In addition to the danger of urosepsis, the onset of epididymitis which often follows catheterization may be avoided if the patient learns to urinate while lying in bed before surgery. Postoperative catheterization may often be avoided if the patient is allowed to stand at the bedside to urinate. Attention to the care with which postoperative catheterization, when necessary, is carried out is very important. Sterile technic, use of as small a catheter as possible (which should be left in place if it is likely that retention will be persistent or recurrent for some length of time), and the minimizing of trauma when catheterization becomes necessary, should be carefully observed. Should genitourinary tract infection be present before surgery, it should be treated until maximum response is obtained. This is of particular importance in operations about the rectum because difficulty in emptying the bladder is likely to be encountered postoperatively, even in patients who have had no such difficulty in the preoperative period.

3. *Vascular.* The danger of thrombophlebitis with or without pulmonary emboli is even more hazardous in advanced age than it is in younger patients. The possibility of prophylactic femoral vein ligations should be seriously kept in mind, especially when a patient's operative or postoperative period is likely to be either very long, shocking or associated with long periods of

rest in bed. This is likely to be necessary following resection of the esophagus or the perineal portion of the rectum. Anticoagulant therapy cannot always be administered safely because of the large open surfaces which must of necessity be left after perineal resection of the rectum or esophagus, and because of the possibility of hemorrhage into the pleural or peritoneal cavities following resection.

LOCAL CARE

The local care of the gastrointestinal tract should aim at (1) relief of obstruction, (2) sterilization and liquefaction of the gastrointestinal contents, and (3) reduction of the bulk of fecal material as much as possible. This can be accomplished in the following manner:

1. When an esophageal carcinoma is totally obstructed, lavage of the esophagus has been recommended by Sweet.

2. Obstruction of the gastrointestinal tract below the esophagus can best be relieved by oro-nasal gastric suction as long as the obstruction is above the level of the ileocecal valve and the amount of obstruction is not too great. Obstruction of the outlet of the stomach is particularly benefited by decompression. If the aspiration is carefully practiced, local tissue edema may be relieved to such an extent that patency is re-established. Once this is accomplished, alimentation may be given the attention it needs in the preoperative care. Whether or not such a restoration in patency is adequate will have to be decided by the ability of the patient to take sufficient amounts of fluid and nourishment. Decompression with the Miller-Abbott tube is as strongly indicated in obstructions of the small bowel in the aged as it is in other patients. The same limitations to its use apply. If the ileocecal valve is incompetent, the Miller-Abbott suction will also partially benefit obstructions in the colon. The area of the right colon, when it becomes obstructed, cannot be adequately handled by any non-operative means and for this reason decompression is only partially useful and operation may have to be done while the bowel is partially or completely obstructed.

Sterilization and liquefaction of the fecal material are best accomplished by the use of the gastrointestinal antiseptics, sulfathaladine and sulfasuxidine being the drugs of choice. Such preparation is essential. These drugs, given by mouth, have a wide margin of safety and may be given in doses of gm. ii to iv q.i.d. There are occasional patients who are sensitive to sulfasuxidine or sulfathaladine. The work of Poth[1] has shown the tremendous importance of a gut prepared by the use of these drugs for the proper healing of intestinal suture lines. The high rate of absorption of sulfaguanadine has made this drug obsolete.

THE REDUCTION in bulk can be accomplished by the administration of a non-residue diet during the preoperative period, and by the use of enemata. In colon cases the enemas must be given with great care not only because of the danger of perforation of diverticulae which occurs in this older age group, but particularly because careful cleansing will allow the surgeon

to perform a safer operation. Often an operation must be abandoned or a different procedure used if large amounts of stool are present in the colon at the time of exploration.

GENERAL COMMENT

The obvious necessity of restoring the patient to the minimum standard of proper physiologic balance with adequate administration of fluids, electrolyte, blood, protein, vitamins, etc., is only mentioned for the sake of completeness. It should be mentioned here that the majority of patients who must undergo gastrointestinal surgery require at least a week of preparation. During this week of preparation the importance of adequate exercise cannot be overemphasized. Such patients must not be allowed to lie around in bed. If the patient is active, there will be less retained bronchial secretions as well as increase in strength and improved circulation.

Explanation of the program to these patients has always been associated, in the author's hands, with cooperation on the part of the patient. Conversation with the patient about anticipated complications and the role of the patient in helping avoid them has proven of great benefit. Frank discussion of these complications and the means of their prevention has given many apprehensive patients a sense of security in the feeling that they can actively help avoid these complications. The importance of postoperative coughing is to expectorate mucus in order to prevent atelectasis. The value of moving about in bed to improve circulation and avoid the formation of blood clots should be emphasized. At the same time if the patient is psychologically acceptable to such discussion they should be appraised of the likelihood of indwelling tubes of various sorts. In this way they will be forewarned and finding these tubes in place on awakening will not be disturbing to the patient. Retention catheters, thoracotomy tubes, and oro-nasal tubes will thus be less likely to be disturbed or removed by the patient. It is particularly important in older people because postoperative sedation makes them undependable.

The test of cardiac reserve now used is roughly that of exercise tolerance. It is possible that advances in this field, such as the use of the tilt table in measuring vascular reserve, may allow more accurate evaluation of the patient who possesses limited reserve. Adequate renal reserve is another matter of importance. Patients who have evidence of retention of nonprotein nitrogen should be approached with especial care, as should those who show an impaired renal concentration and dilution ability. Recent studies by deTakats show that the proper charting of water excretion may enable us to recognize a patient whose renal threshold is more critical than the usual laboratory test will show.

Decision as to the time for instituting operative attack will often be influenced by the patient's condition, and their nutrient state. Sufficient

local improvement about a lesion may occur so that the operation may be delayed until the patient is in better condition to tolerate surgery.

OPERATION

Supportive care during the operation, while obvious, should never be left to routines. Gastrointestinal surgery, particularly for carcinoma, may require more extensive resection than had been anticipated preoperatively, and a great loss of blood may occur suddenly. Large amounts of blood, 500 cc per hour of operating time plus volume for volume replacement of that lost, should be anticipated and be in readiness. In the presence of serious cardiac conditions, particular care should be exercised to avoid administration of too large a volume of blood or fluid, particularly normal saline. The presence of indwelling Wangensteen suction tube in cases of surgery of the upper gastrointestinal tract or of an indwelling catheter in rectal surgery should be routine.

THE PROPER choice of anesthesia can properly be left to the discretion of the anesthetist when a trained anesthesiologist is in charge of the case. It is occasionally necessary to do major surgery in poor risk patients without an anesthesiologist. In such cases, the author prefers the administration of open drop ether while a nasal catheter administers oxygen. It should be remembered that the attractive qualities of cyclopropane may be more than counterbalanced by the unfavorable cardiac effects, especially when they are likely to be overlooked or misconstrued. The position of the patient on the table may be a matter of great import. We have recently had to abandon an attempted thoracic esophageal resection because the patient could not lie on the right side. The following day, at great technical inconvenience to the surgeon, the same operation was carried out with the patient on his back with no vascular disturbance. While rare, such technical inconvenience to the surgeon is associated with successful execution of the proposed procedure. The position of the patient should not be changed while under anesthesia, if at all possible, and certainly the position should never be changed violently or rapidly. This is of particular importance in abdominoperineal resections of the rectum. Such patients should have the perineal operation executed in the lithotomy position, which, in itself by draining the legs of any pooled blood, may effect autotransfusions. When such positions are assumed, however, restraining devices should be minimized. Such things as knee straps, pressure of the legs against stirrups, etc., are particularly to be avoided since they may predispose to calf-vein thrombosis. At the conclusion of the operation the legs should be lowered slowly with careful checking of the blood pressure, since shock may suddenly develop.

Local technical problems. In resections of the upper gastrointestinal tract in very poor risk patients, the length of anesthesia is a matter of importance. On one occasion, the author, in error, elected to do a gastric resection when a more conservative operation (then a gastro-enterostomy, now a vagotomy)

would have accomplished surgical relief in half the time. This patient recovered from the operation satisfactorily, but never recovered sufficiently to be able to expectorate the mucus which eventually caused a fatal atelectasis.

Since it is rarely possible to shorten the operation of esophageal resection to much less than 4 to 5 hours, such arduous procedures must be fully anticipated before being undertaken. In the case of any proposed resection, the careful evaluation of the patient's tolerance during the early part of the operation should be made. After the bowel is devitalized by clamp, resection is obligatory, yet might easily be postponed if the patient's condition indicates that the proposed procedure is too hazardous. In treating carcinoma of the large bowel, it should be remembered that the combined abdomino-perineal resection leaves the patient with almost no pelvic diaphragm. This prevents the use of early ambulation, and if this is likely to be important as a prophylactic step against the serious and frequent complication of atelectasis, a stage operation may be the best procedure. The author has had one patient in her 70's in whom a two-stage resection was successful. She had great difficulty in satisfactorily expectorating the small amount of mucus which formed after a loop colostomy was done—this in spite of early ambulation, CO_2, tracheal aspirations and very vigorous cooperation with coughing, etc. Abdomino-perineal resection was purposely avoided in her case, since we felt she would not be able to cough adequately without the presence of the levator ani muscle.

Frank discussion with the house officers about proposed procedures should be carried out and an opportunity given to all concerned to discuss the problems. They will often emphasize a point which the surgeon had inadvertently overlooked. In the patient mentioned above, the suggestion to change the proposed operation from a one-stage abdominal perineal resection to a two-stage operation was made by a member of the house staff.

COLON

The slow healing which occurs in advancing years makes it imperative that no primary anastomosis of the colon should be done when such an anastomosis will drop back into a free and locally unprepared peritoneal cavity. Such operations as one-stage resections of the intraperitoneal portion of the colon should either be accompanied by a preliminary proximal colostomy for lesions in the left colon or an exteriorizing operation for lesions in the right colon. When carefully done, exteriorization of the tumor after the Rankin technique can be as radical technically as primary resection, yet will allow local adhesions to form about the operative site. This will give protection when closure of the ostomy is accomplished at a later date. The concomitant or preceding colostomy removes the possibility of accumulation of gas which would threaten the suture line.

In an unprepared patient, the use of a primary anastomosis of the colon is inexcusable. When a tumor is encountered accidentally, it must be either exteriorized or resected and the suture site protected by preliminary colostomy. When the tumor is in such a position that the suture line must be replaced into the abdomen and will lie in the free peritoneal cavity, the abdomen should be closed without resection and after a period of proper preparation, the abdomen reopened and proper treatment established. Rectal dilatation before the patient leaves the operating table will add considerably to the patient's comfort by allowing him to pass gas easily.

Technical considerations. Again, in patients of advanced years, old and established principles demand even more careful observation than they do in youth. Tension on suture lines must be completely avoided. Any tension may be associated with delayed separation of the anastomotic site. The inner layers of the suture line may be carried out in one of several ways, but the outer layer should always be executed with a row of interrupted fine, non-absorbable, closely-placed sutures. Suture lines should be meticulously inspected after being completed lest an unseen defect pass unnoticed.

In esophageal anastomosis, the author has used an intermediate layer of colored silk which he then folds in by the outer layer. In this way he can be certain that the anastomosis was properly executed if the colored silk is completely covered. Again, the use of decompression prevents accumulation of gas above and at the suture line. The suture lines may be reinforced with available omentum. Non-absorbable coagulants (gelfoam, oxycel, etc.) must be kept away from suture lines, as shown by the recent work of Laufman.[2]

When large areas of extraperitoneal tissue have been exposed and dissected, the likelihood of some contamination and drainage must be anticipated. Local drains may occasionally be needed and may be brought out suprapubically or perineally. They should not be brought out vaginally when a primary resection of the rectum has been done since a leak in the anastomotic line plus a vaginal drainage have given the author at least one case of retovaginal fistula which required surgical repair for cure.

POSTOPERATIVE CARE

The usual attention to blood transfusions to maintain normal blood counts, fluid administration, and so forth, is obviously essential. In operative procedures on the gastrointestinal tract, avoidance of excess amounts of salt, as emphasized by Coller, is of especial importance. This is done to prevent obstruction of the lumen by localized tissue edema. Early movement and ambulation should be particularly stressed and can be carried out in all cases except those with one stage abdominoperineal resections. When esophageal resections have been done, careful anchoring of the stomach or jejunum to the pleura and to the thoracic cage by many sutures must be done at the time of operation. This step will avoid any traction which might be present on the suture line when early ambulation is instituted.

TRACHEOTOMY has been necessary in several of the author's cases of thoracic esophagectomy to facilitate the removal of mucus by aspiration in this group of patients. Reluctance to cough is often due to pain. The pain may be lessened by the judicious use of intravenous alcohol or in thoracic cases by the use of intercostal nerve block. Occasionally the adequate administration of morphine, by cutting down the pain, will allow patients to cough freely, even though it may tend to reduce the sensitivity of their cough reflex. When morphine is given, CO_2 must be strenuously used or the use of a mixture of nitrous oxide, oxygen and carbon dioxide will give enough analgesia to enable the patient to cough without undue discomfort.

In the cases which require multiple operations, particularly those in which colostomy precedes resection of the bowel, it is the author's feeling that the second operation must be avoided until the patient has made recovery so complete that he asks for the second stage. It should never be done in less than 3 weeks because the vascularity of the adhesions which form with the first operation will be troublesome. In many cases this may require a month interval. The benefits obtained by waiting so that the second operation is performed on a fully rehabilitated patient will warrant the long wait.

CONCLUSIONS

It should be remembered that to a person in advanced years the few remaining years of life may seem to be the most important of all. This is evidenced by the willingness, in fact the anxiousness with which older people seem to ask for operation when surgery is suggested to them. Surgery, even of the most radical sort, may be and should be made available to such older patients, as well as to those in the prime of life. While necessarily carrying a somewhat higher mortality, many of the complications which in the past have resulted in fatalities may be anticipated and avoided by attention to many of the details which are mentioned above.

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AMERICAN GERIATRICS SOCIETY MEETING

THE 6th annual meeting of the American Geriatrics Society will be held in Atlantic City, New Jersey, Hotel Brighton, June 2-3-4, 1949. The complete program for the meeting is on page 192 of this issue.

A Psychometric Evaluation of Aged White Males*

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SINCE THE increased life span of human beings has multiplied the problems related to the process of aging, gerontology is receiving more attention from physicians, biologists, sociologists and psychologists. Reports have appeared concerning the intellectual changes which are found with increasing age. The results of various psychometric tests have shown the rate of change of specific factors in relation to aging. Actually, most of these reports (Babcock,[1] Shipley,[18] and Wechsler[20]) attempt to estimate numerically the amount of mental deterioration which accompanies the aging process.

The present report is preliminary. It attempts to measure personality and intellectual changes as well as physical changes of aged white males. In addition an attempt was made to correlate these mental and physical findings, but this was difficult, and not entirely satisfactory because of the present available methods and the small number of cases studied.

FOR THIS study the Wechsler-Bellevue Intelligence[20] and Rorschach[2] tests were used. The Wechsler-Bellevue test is divided into ten subtests, five of which are verbal and five are nonverbal tests. The verbal scale includes the following tests: General Information, Comprehension, Arithmetical Reasoning, Memory for Digits (forward and backward), and Similarities. On most of these tests, the subject is not required to respond within any specific time limit. The performance scale is made up of the following tests: Picture Arrangement, Picture Completion, Block Design, Object Assembly, and Digit Symbol. For these tests the subject is required to respond within a specific time limit. Wechsler[20] also includes a vocabulary test which may serve as an alternate for any of the verbal tests. In this study the vocabulary test was administered to all the subjects, enabling a comparison to be made between the vocabulary and the verbal scores and vocabulary and performance scores. Thus, the intellectual level was measured. The intelligence quotients determined for each subject were calculated using Wechsler's formula for obtaining I.Q.'s for ages beyond 60 years. In addition an appraisal of the intellectual deterioration of the subjects was made using Wechsler's[20] suggested method of comparing the tests which "hold up" with age with the tests which "do not hold up" with age. The tests which

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hold up with age are the Information, Comprehension, Object Assembly, Picture Completion, and Vocabulary. Those tests which do not hold up with age are the Memory for Digits, Arithmetical Reasoning, Digit Symbol, Block Design, Similarities and Picture Arrangement.

Numerous psychologic and sociologic studies (Cowdry,[4] Kaplan,[6] Lawton[8]) describe the personality changes in old age. However, there are few (Prados[15]) studies available using the Rorschach test in evaluating these personality changes. The Rorschach test consists of a series of ten standard, meaningless ink blots which are shown to the subject one at a time. The responses to these ink blots are studied and enable the examiner to understand the organization of an individual personality. The experienced Rorschach student is able to evaluate personality integration, the quality and intensity of emotional reaction and level of intelligence. The Rorschach has been used for the detection of intracranial damage, as the review of Klopfer and Kelly[7] so ably demonstrates. Piotrowski[12,13,14] lists ten signs found on the Rorschach which are significant of organic disturbances of the central nervous system.

THE TWENTY subjects used for this study were drawn from the wards of the Oak Forest Infirmary. Their ages ranged from 64 to 83, with an average age of 72 years. The educational background of the group was varied, one man had one year of college; another had no formal training. Two subjects were high school graduates; six had graduated from grammar school, while twelve stopped their education earlier in this period. Eleven of the group had never married, while six were widowed, two married and one divorced. All had been wage earners with an almost even distribution between skilled and unskilled occupations. The length of their stay at the institution was from six months to twenty years.

The complaints of the patients were numerous. Some seemed content with the duties given them to perform around the institution. Others were not. Eleven complained of joint pains or stiffness, six had urologic symptoms, four mentioned symptoms which could be interpreted as cardiovascular, and two complained of tremor.

The physical examinations revealed arteriosclerosis to be present in some degree in all but two of the subjects, aged 64 and 65 years. Emphysema was the next most common finding. Five patients were amputees and three had far advanced atrophic arthritis. Using 140/90 mm. Hg. as a dividing line between high and normal blood pressure, nine would be classified as having increased pressures. Often, however, the diastolic pressure was noted to be low when frequent blood pressure readings were recorded. True hypertension could not be said to exist in more than two patients; one 65 and one 75 years. An arcus senilis was present in fourteen instances.

No accurate estimations of the heart size were possible, but, enlargement was present probably in one-half of the patients. Roentgenograms, for comparison, could not be made uniformly at two meter distances for various reasons. The films did reveal calcifications in the aorta, at the arch in thirteen

instances. Tortuosity of the aorta, in some degree, was present usually. Films of the abdomen taken in the lateral position demonstrated calcium deposits along the course of the abdominal aorta in fifteen instances. Hypertrophic arthritic changes of the lumbar spine were present in all the patients.

Electrocardiographic studies were made using in addition to the classical leads, unipolar extremity[3] leads and multiple precordial leads.[4] Sinus mechanism was present usually (18 times). Of these seven showed premature systoles, and bundle branch block was present in four. Auricular fibrillation and an impure type of block (Wenckebach phenomenon) were present in the remaining two tracings. Left axis deviation was present nine times, usually because of a horizontal or semi-horizontal position of the heart. Myocardial fibrosis or evidence of a frank myocardial infarct was diagnosed in ten of the curves.

RESULTS

Wechsler-Bellevue Intelligence Test. Table 1 shows the results of the verbal and performance tests, the full scale intelligence quotients, I.Q., as well as the deterioration quotient for each subject. Since the scores of the vocabulary tests were available, a vocabulary I.Q. was determined and appears in Table 1 for each patient. The results of the tests of subjects 9 and 16 are not considered reliable. Both were cooperative but H. G., 81 years old, tired easily and made no score upon 5 of 11 subtests. F. S., 64 years old, presented personality problems which affected the reliability of the results. Thus, it may be seen for 18 subjects where the results were considered reliable that 15 of the subjects have an average full scale I.Q. (average range of 91-110),

NO.	NAME	CHRONOLOGIC AGE	VERBAL I.Q.	PERFORMANCE I.Q.	FULL SCALE I.Q.	VOCABULARY I.Q.	DETERIORATION QUOTIENT	DETERIORATION PER CENT
1.	E.A.	79	109	106	105	135	52	48
2.	N.B.	72	99	110	103	94	88	12
3.	D.C.	70	94	98	90	104	61	39
4.	J.C.	78	106	108	101	109	55	45
5.	F.D.	74	110	101	99	104	92	8
6.	M.D.	71	89	99	84	99	55	45
7.	R.E.	67	98	106	97	104	73	27
8.	E.F.	71	103	119	106		34	66
9.	H.G.	81	73	63	74	79	75	
10.	D.H.	74	103	111	98	109	53	47
11.	L.H.	65	103	103	99	109	72	28
12.	L.L.	64	93	85	83	79	100	0
13.	R.L.	65	104	116	103	99	68	32
14.	J.M.	74	102	110	103	94	69	31
15.	G.S.	78	117	112	108	135	48	52
16.	F.S.	64	73	87	73	84	25	
17.	S.S.	83	87	74	81	88	25	75
18.	A.S.	69	101	101	105	99	81	19
19.	C.W.	76	108	114	107	124	66	34
20.	E.W.	71	91	110	97	94	61	39

TABLE I. SHOWS THE SCORES FOR INTELLIGENCE AND DETERIORATION QUOTIENTS FOR TWENTY AGED WHITE MALES

while the remaining three (Nos. 17, 12, 6) were within the dull normal range (80-90). The table shows further that 13 of the subjects had higher vocabulary I.Q.'s than full scale I.Q.'s. It must be remembered that the full scale I.Q. is based on the ten subtests while the vocabulary I.Q. is dependent on the vocabulary score alone.

According to Wechsler, "An individual may be said to show signs of possible deterioration if he shows a greater than a 10 per cent loss, and of definite deterioration if a loss greater than 20 per cent than that allowed for by the normal decline with age." Only 4 of the deterioration quotients may be considered insignificant (Nos. 2, 5, 11, 18). Fourteen subjects show deterioration per cent scores ranging from 27-75, the average being 43.4 per cent. Figure 1 is a graph showing the relationship of the deterioration to the chronological age for each subject. The graph indicates that there is a positive correlation between the amount of mental deterioration and the chronological age.

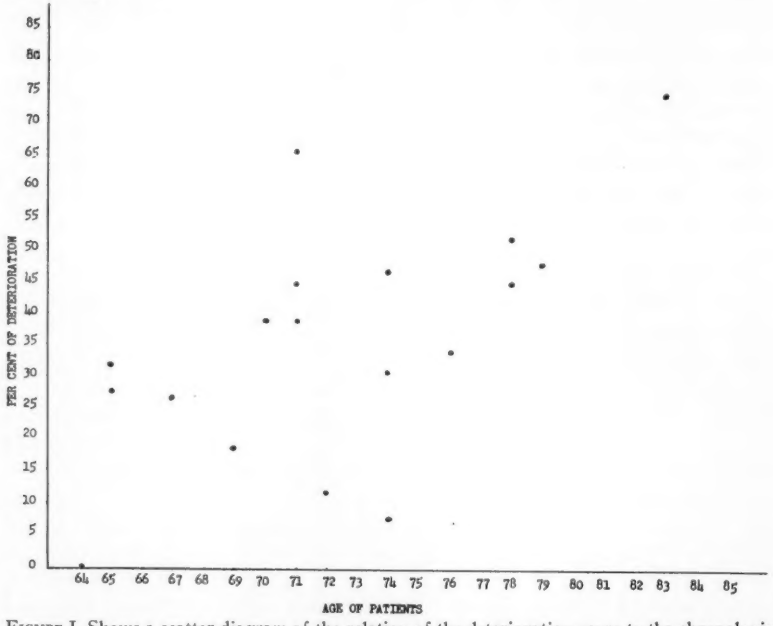

Figure I. Shows a scatter diagram of the relation of the deterioration score to the chronologic age of patients.

The results on the subtests were compared for each of the subjects. The rank order of the weighted scores on the ten subtests plus the Vocabulary test revealed the following: Vocabulary, Information and Comprehension ranked highest while Digit Symbols, Block Designs and Picture Arrangement were the lowest.

The Rorschach Test. The details of the results of the Rorschach Test are presented in Table 2. It will be noted that the method of scoring the

NO.	NAME	Age	R	T/R	T/1sR	Z	P	F+	A	S	Exp	M	C	CF	FC	Y	YF	FY	FV	PO	DW
1.	E.A.	79	13	41.7	10.8	15	6	78	62	0	2/1	2	0	0	1	0	0	1	0	0	0
2.	N.B.	72	27	38	25.9	12	5	79	52	2	2/1.5	2	1	0	0	0	0	0	0	0	0
3.	D.C.	70	11	37	11	17.5	6	75	64	0	2/0	2	0	0	0	0	0	1	0	0	0
4.	J.C.	78	12	53.8	23	14	2	100	58	0	0/4	0	2	1	0	0	0	0	0	0	0
5.	F.D.	74	40	63.9	50.2	13	5	50	45	3	3/1.5	3	1	0	0	0	0	1	0	0	0
6.	M.D.	71	21	40	22.6	5.5	2	60	14	1	2/7	2	3	2	1	0	0	1	0	0	0
7.	R.E.	67	16	81.2	52.7	12	6	77	69	0	2/0	2	0	0	0	0	0	1	0	0	0
8.	E.F.	71	15	36.7	24.7	10.5	6	62	62	0	1/0	1	0	0	0	0	0	0	0	1	0
9.	H.O.	81	14	35.9	8.5	6.5	3	62	79	0	0/0	0	0	0	0	1	0	0	0	0	0
10.	D.H.	74	29	25.5	8.8	6.0	7	78	38	1	3/0	3	0	0	0	0	0	1	1	0	0
11.	L.H.	65	24	50.4	29.4	16.5	10	63	33	2	4/1.5	4	1	0	0	2	0	0	1	0	0
12.	L.L.	64	16	45.3	25.2	9.0	5	93	69	0	1/0	1	0	0	0	0	0	1	0	0	1
13.	R.L.	65	17	52.3	23.9	18	4	86	53	0	1/1.5	1	1	0	0	0	0	0	1	0	0
14.	J.M.	74	26	44.9	23.1	8	3	72	54	0	1/0	1	0	0	0	0	0	0	0	0	0
15.	G.S.	78	19	29	15.5	22	6	57	53	1	3/0	3	0	0	0	0	0	2	0	0	1
16.	F.S.	64	17	53.4	23.4	21	0	30	0	2	0/4.5	0	1	3	0	0	0	2	0	1	0
17.	A.S.	69	10	116.6	69.8	14	6	100	50	0	3/0	3	0	0	0	0	0	1	0	0	0
18.	S.S.	83	12	82.1	31.0	6.5	3	82	50	0	1/0	1	0	0	0	0	0	0	0	0	0
19.	C.W.	76	12	62.4	16.4	2.0	4	67	42	0	2/0	2	0	0	0	2	0	0	0	0	0
20.	E.W.	71	10	89.3	40.7	9.5	3	100	30	4	0/3	0	2	0	0	0	0	0	1	0	0

TABLE II. SHOWING RORSCHACH SUMMARY FOR EACH SUBJECT

In the table, "R" signifies responses:

"R"—responses
"T/R"—average time per response
"T/1stR"—time of first response
"Z"—organizational score
"P"—popular response
"F plus"—good form response
"A"—animal response
"S"—white space
"Esp"—experience balance
"M"—movement
"C"—color
"CF"—color-form
"FC"—form-color
"Y"—determined response
"YF"—light and form
"FY"—form and light
"FV"—form and vista
"PO"—position response
"DW"—secondary whole response

Rorschach which was used follows the method described by Beck.[2] The number of responses per record ranged from 10 to 40, the average being 18. This is slightly below the average found for normal adults. The time per response (T/R) and the time per first (T/1stR) is somewhat increased in 17 of the 20 subjects. The average time per response was 54. The F + (good form response) is above 70 per cent in all but 7 cases and in only 3 of these 7 cases does it go below 60 per cent. Sixty per cent is considered to be the critical minimum for healthy adults. The F + per cent is an indicator which shows the subject's ability to evaluate reality and also his ability to exercise conscious control. The A or animal response and P or popular response are of importance in evaluating adaptive thinking. The A per cent is above 25 per cent in 18 of the 20 cases. The A per cent ranges from 0 to 79, the average being 49. The response to color on the Rorschach test is used to evaluate the emotionality of the subject. Eleven of the subjects gave no color responses and five gave only one color response. The M or movement response is of value in understanding the fantasy activity of the subject. Four subjects gave no M response, five subjects gave only one movement response, six subjects gave two M's, four gave three M's, and one subject gave four M's. The average number of M responses was 1.6. Six subjects made no response to one of the ten cards and one subject rejected two of the cards.

Table 3 gives a summary of Rorschach results evaluated according to the ten organic signs of Piotrowski.[12,13,14] According to Piotrowski five or more

NAME	DETERIORATION PER CENT SCORE	AGE	R	T/R	M	F+%	P%	Cn	Rpt	Imp.	Plx	Ap	Cards Rejected
E.A.	48	79	13	41.7	2	78	46	0	0	+	0	0	I, IX
N.B.	12	72	27	38	2	79	18	0	0	0	0	0	0
D.C.	39	70	11	37	2	75	55	0	0	0	0	0	I, IX
J.C.	45	78	12	54	0	100	17	+	0	0	0	0	0
F.D.	8	74	40	64	3	50	13	0	0	0	0	0	VI
M.D.	45	71	21	40	2	60	10	0	0	+	0	0	0
R.E.	27	67	16	81	2	77	38	0	0	0	0	0	0
E.F.	66	71	15	37	1	62	40	0	0	0	0	0	0
H.G.	25	81	14	36	0	62	21	0	0	+	0	+	0
D.A.	47	74	29	25	3	78	24	0	0	0	0	0	0
L.H.	28	65	24	50	4	63	42	0	0	0	0	0	0
L.L.	0	64	16	45	1	93	31	0	0	+	+	0	0
R.L.	32	65	17	52	1	86	24	0	0	0	0	0	0
J.M.	31	74	26	45	1	72	11	0	0	+	0	0	0
G.S.	52	78	19	29	3	57	32	0	+	0	0	0	0
F.S.	75	64	17	53	0	30	0	0	+	+	0	0	0
S.S.	75	83	12	82	1	82	25	0	0	+	0	0	VI
A.S.	19	69	10	117	3	100	60	0	0	+	0	0	X
C.W.	34	76	12	62	2	67	33	0	+	+	0	0	IV, IX
E.W.	39	71	10	90	0	100	30	0	0	+	0	0	X

TABLE III. SUMMARIZING RORSCHACH SCORES IN TERMS OF PIOTROWSKI'S TEN ORGANIC SIGNS

In the table "R" signifies the number of responses; "T/R" signifies the average time per response; "M" equals movement; "F plus %" is the percentage of good form responses.

1. "R"—number of responses.
2. "T"—average time per response.
3. "M"—movement response.
4. "F plus %"—percentage of good form responses.
5. "P %"—percentage of popular responses.
6. "Cn"—color-naming.
7. "Rpt"—repetition.
8. "Imp"—impotence.
9. "Plx"—perplexity.
10. "Ap"—automatic phrases.

signs present in a Rorschach record are indicative of organic brain damage. Only two subjects have five signs present and only one subject has six signs present. Fourteen subjects showed signs of impotence in their records.

DISCUSSION

In evaluating the results of this study several factors must be considered. FIRST, since the number of patients studied is small, the data accumulated can at best show only trends and suggest lines for further study. SECOND, it is important to realize that the study deals with a select group of the population. The subjects used in this study come from a low-income group of the population. The social, educational and occupational backgrounds also varied. THIRD, factors affecting the validity and reliability of the subject's results on the tests must be considered. These would most likely be important in the intelligence test scores since it is essential here to have the patient's

cooperation. Lowered attention span and fatigue might be expected to affect the results on the sections of the tests administered last. FOURTH, the effect of institutionalization on personality must also be considered. FIFTH, comparison of the present results with those of other authors is difficult since this must include an evaluation of the age distribution in addition to the average age, the sex of the subjects, the educational and occupational backgrounds, as well as the average I.Q.

THE Wechsler-Bellevue Intelligence Test was used mainly to measure intellectual deterioration. There is a positive correlation between the amount of intellectual deterioration and the age of the patient. Of further significance is the fact that fifteen subjects showed deterioration quotients which Wechsler considers pathological. We were unable to find any correlation between the intellectual deterioration quotient of the subject and physical findings or with the results on the Rorschach test.

We have compared our results, Table IV, on the ten subtests with the recently published works of Madonick and Solomon[9] and by Rabin[16] in a similar study of elderly people. Using the rank order for comparison, we found that the order of performance in the three series agreed exactly in the best and worst categories. Indeed, there were only slight discrepancies in the rank order which could not be explained by the small samplings in all the studies, and by the selected sampling (males) in the present study. Since the rank order of the subtests is important in the calculation of the deterioration quotient, which is a ratio between the tests which hold up with age and those which decline with age, it is essential that we accurately ascertain the order of decline of ability with increase in age. For this purpose, obviously, far greater numbers of tests will be necessary than are available at present.

TESTS	PRESENT STUDY (Ages 64 - 83)	MEDONICK & SOLOMON'S STUDY (Ages 60 - 85)	RABIN'S STUDY (Age 50 & over)
Information	1	1	1
Comprehension	2	2	2
Arithmetical Reasoning	3	5	5
Picture Completion	4	8	7.5
Similarities	5	3	3
Memory for Digits	6	6	4
Object Assembly	7	4	6
Picture Arrangement	8	9	9
Block Design	9	7	7.5
Digit Symbol	10	10	10

TABLE IV. RANK ORDER OF PERFORMANCE ON WECHSLER-BELLEVUE SUBTESTS COMPARED WITH PREVIOUS SIMILAR STUDIES

For those who are interested in the Rorschach scoring, two tables are included giving the results for each of the subjects. Table II shows the summary of the Rorschach records for each subject. Table III summarizes the Rorschach findings which Piotrowski suggests are organic signs.

In evaluating the results of the Rorschach tests we attempted to see if there was any relationship between the deterioration score on the Wechsler-Bellevue and the number of organic signs of Piotrowski shown on the individual Rorschach tests. No positive correlation was found. This leads us to believe that the organic signs of Piotrowski are not primarily related to the organic process of aging. The sign which was most frequently found was that of impotence. By impotence is meant the giving of a response despite a recognition of its inadequacy. This sign was present in the records of ten subjects. Only two subjects showed the number of signs diagnostic of organic brain damage. One of these subjects had a Rorschach record similar to those found for patients who are schizophrenic of the paranoid type.

By interpreting each record, certain general findings for the group are suggested. There is a lack of richness both in the intellectual and emotional spheres. Intellectual control was found to be within normal limits in all but three of the subjects. All but four of the subjects showed introversive trends. Neurotic shock was present in most of the records. Other findings of significance were suspiciousness, anxiety and depressive trends. There is a tendency for the subjects to be stereotyped and somewhat conventional in their thinking. Although these records were not typical of organic brain damage, the general findings of delayed responses, reduced number of responses, stereotyped thinking, constriction and impotence might be related to the aging of the mental processes.

Attempts were made to correlate the clinical status of these patients with the results of the Rorschach and Wechsler tests. The small number of patients examined did not permit elaborate comparisons. However, no group scored more poorly because symptoms or signs of serious physical disease were present. The group showing cardiac conditions (i.e., J.H., P.H., F.S.) showed no test peculiarities. This was true, also, for the group having marked atrophic arthritis, and the amputees, whose locomotive ability was seriously impaired. Therefore, it would seem that the use of these tests, as scored in the present study, shows the influence of the aging process, and, these tests are uninfluenced, in this select group, by any other factor.

Arteriosclerosis was present in all to some degree. The amount of sclerosis as estimated clinically tended to increase with age. Again, no correlation was possible.

SUMMARY AND CONCLUSIONS

1. Twenty aged white males were examined and personality and intellectual changes were measured by means of the Wechsler-Bellevue and Rorschach tests.

2. No correlation could be found between these tests and physical conditions present.
3. There is a positive correlation between the amount of mental deterioration and the chronologic age.
4. The rank order of the weighted scores on the ten subtests plus the Vocabulary Test of the Wechsler-Bellevue Intelligence Test was: Vocabulary, Information, Comprehension, Arithmetical Reasoning, Picture Completion, Similarities, Memory for Digits, Object Assembly, Picture Arrangement, Block Design and Digit Symbol.
5. There was no correlation between the deterioration scores and the results of the Rorschach tests.
6. The evaluation of the Rorschach test shows generally: Delayed responses, reduced number of responses, stereotyped thinking, constriction in intellectual and emotional spheres, and impotence. In this group these are related to the aging of the mental processes.

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Lipotropic Agents in Experimental Cholesterol Atherosclerosis in Rabbits*

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In 1937, Huber, Broun and Casey[1] reported protection of cholesterol fed rabbits against development of atheromatosis by use of an alcoholic extract of pancreatic tissue. Blood cholesterol failed to rise in the small series of animals studied at this time. The investigations to be reported in the present communication are a continuation of those studies in which we sought confirmation of the original observations of the effect of pancreatic extract and also attempted to determine whether the action of our pancreatic extracts might be attributed to their choline content.

In 1942, Vermeulen, Dragstedt, Clark, Julian and Allen[2] published an extensive study of the effects of the pancreatic extract "lipocaic" administered to rabbits which were at the same time fed from 0.25 to 1.0 gram of cholesterol daily in sunflower seed oil. The dietary experiment extended over a period of sixty to three hundred and sixty days. They observed that lipocaic, up to half the amount required to prevent fatty liver in the depancreatized dog, not only failed to prevent hypercholesterolemia, but actually appeared to accelerate the rise in blood cholesterol and cause it to persist longer than in the animals which received no lipocaic. On the other hand, the noncholesterol lipids of the blood, chiefly phospholipids and neutral fat, decreased in amount when lipocaic was administered. Lipocaic, in this study, neither delayed nor modified the severity of atherosclerosis. However, since there were probably differences in methods of preparation, standardization and dosage of extracts of the lipocaic type, and particularly since we have compared the action of our extracts with that of choline, betaine, methionine and inositol, we feel it may be worth while to report our findings with the idea of stimulating further studies along these lines.

We prepared in our laboratories at four different times, extracts of pancreatic tissue, following as well as we were able the directions for the preparation of lipocaic given by Dragstedt, VanProhasha and Harms.[3] One lot of this material was prepared by Huber and used in the study published

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in 1937.[1] The other three were prepared by Andrews. These will be designated "Lipocaic, Andrews Lot 1, Lot 2, and Lot 3," respectively. Whether the resultant extracts should truly be called "Lipocaic" may be open to some question, since they were not standardized by the effect on fatty livers of depancreatized dogs. We claim no more for them than that they were made by extraction of pancreatic tissue with sixty per cent ethyl alcohol; this extract was then evaporated at a temperature less than 40° C. The residue after evaporation was extracted with ether. The material left after ether extraction was the material used in our studies.

The variations in preparation of the various lots of extract which we made, were concerned chiefly with the promptness with which refrigeration was instituted and maintained after the organs were removed from the body of the slaughtered animal. In some preparations of extract, there was a prolonged period during which autolysis could have occurred. In others, refrigeration was promptly instituted and maintained to the time of extraction.

IN ADDITION to the four extracts prepared in our laboratories, we secured through the courtesy of Doctor L. R. Dragstedt, five shipments of "Lipocaic" from the laboratories of Eli Lilly and Company. Doctor Dragstedt, in February, 1938, wrote in regard to this extract, that the material which was being sent was not made according to his first method, but was one of the by-products of the insulin procedure. The preparation, however, seemed to be active in preventing and relieving fatty infiltration of the liver of depancreatized dogs, and contained no insulin. We did not ourselves determine nor did we receive any information regarding the quantity of this material needed to protect dogs from fatty liver, and hence that method of regulating dosage was not used. These preparations will be designated in this paper as "Lipocaic Lilly Lot A, Lot B, Lot C, Lot D and Lot E."

Steiner[4,5] has reported that choline has some preventive action in cholesterol atherosclerosis of rabbits. Fletcher, Best and Solandt[6] have found that pancreatic tissue may contain in excess of 200 mg. of choline per 100 grams.

In the studies now to be reported, we were interested not only in the effects of the pancreatic extracts, but also in the question of how far those effects might be attributed to any choline which they contained. There is ample evidence that our extracts were not of homogenous composition since the choline content varied widely. In general, the extracts which we ourselves prepared were of considerably higher choline content than those prepared by Lilly and Company. However, with one exception, a small quantity of choline was found in each of the lots of pancreatic extract received. Estimations of choline were carried out by the method of Beattie.[7]

Our dosages of pancreatic extracts are therefore given in terms of choline content. Our own extracts were not reduced to a dry powder, but were placed in solution when still in a gummy state. In terms of original pancreatic material, the dosages given vary from the extract of 50 grams of whole gland

TABLE I
DIETARY EXPERIMENT A
PREVENTION OF EXPERIMENTAL CHOLESTEROL ATHEROSCLEROSIS.
RABBITS THREE MONTHS OF AGE.
PERIOD OF EXPERIMENTAL FEEDING FOURTEEN WEEKS.

Group	Number of Rabbits	Type of Diet and Daily Intake of Supplements	Degree of Atherosclerosis Produced (Number of Animals in Each Category) Zero	One Plus	Two Plus	Three Plus	Four Plus	Mean	Blood Cholesterol Changes: Average Initial Blood Cholesterol	Average Final Blood Cholesterol	Average Increase in Blood Cholesterol
I	8	Rabbit Chow only	8	0	0	0	0	0	55	62	x1.1
II	21	Rabbit Chow, Cholesterol 0.5 gm.	0	3	4	5	9	3.0	75	476	x6.35
III	8	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 500 mgm.	5	1	2	0	0	0.6	120	615	x5.1
IV	18	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #1 (Andrews) and ½ egg yolk contains 200 mgm. of choline	7	6	2	2	1	1.1	74	629	x8.5
V	6	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 75 mgm.	1	3	2	0	0	1.2	117	434	x3.7
VI	6	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #2 (Andrews) contains 75 mgm. Choline	0	0	1	3	2	3.2	102	611	x6.0
VII	6	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 40 mgm.	2	1	2	1	0	1.3	68	565	x8.3
VIII	12	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #3 (Andrews) contains 40 mgm. Choline	5	2	2	1	2	1.4	95	672	x7.1
IX	10	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 10 mgm.	3	3	2	2	0	1.3	114	442	x3.9
X	10	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #A (Lilly) 500 mgm. contains 10 mgm. Choline	4	4	1	1	0	0.9	118	636	x5.4
XI	6	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 2 mgm.	0	0	2	1	5	3.4	Not Determined	509	.....
XII	8	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #B (Lilly) 100 mgm. contains 2 mgm. Choline	3	2	1	2	0	1.0	Not Determined	481	.....

to as much as the extract of 1 kilo of gland material per day. The weights of the doses of powdered extract received from Lilly and Company are given as well as the choline content.

A TOTAL OF 224 rabbits were used in that portion of the investigation now being reported. The study was carried out in three separate experiments with some differences in procedure in each experiment. In the first of these experiments, the rabbits were three months of age at the time the experimental feedings were begun, and the dosage of cholesterol given the animals of the experimental groups was 0.5 gm. daily. This portion of the study has been designated "Dietary Experiment A," and the results are shown in Table I. In the second experiment, the rabbits used were six to eight months of age at the time dietary studies were started, and the dosage of cholesterol in the experimental groups was 0.5 gm. daily, and the results are shown in Table II. In the third experiment, rabbits six to eight months of age were used but the cholesterol dosage was raised to 1.0 gm. daily, and one gram of crisco was also included in the daily ration. This experiment is designated as "Dietary Experiment C," and the results are shown in Table III.

Litter mates were divided between the various experimental groups and sexes were equally distributed. Blood cholesterol determinations were carried out by the method of Bloor.[8]

The basic diet of all animals was Purina Rabbit Chow. The experimental substances fed were intimately mixed with a small amount of chow and the animals required to consume this before additional chow was given.

In the case of cholesterol, the substance was either mixed with egg yolk or dissolved in corn oil before mixing with the chow so as to secure adherence to the particles of chow eaten. No difficulty was encountered in having the animals consume the quantities of experimental material offered. All animals showed gains in body weight—there being little difference in weight between the cholesterol controls and those which received experimental supplements in addition to cholesterol. Those animals receiving basic diet without added cholesterol, gained weight somewhat less rapidly.

The degree of atherosclerosis was graded as zero when no grossly discernible abnormality was present; one plus when only a trace of atheromatosis was noted; two plus when moderate deposits were scattered over the aortic intima; three plus when marked involvement was present; and four plus when the intimal surface of the vessel was practically completely covered with atheromatous material.

RESULTS OF DIETARY EXPERIMENT A

As previously stated, the animals in "Dietary Experiment A" were only three months of age at the time the experimental feedings were begun. Those animals to whom cholesterol was given received a dose of 0.5 gm. daily. The results of this experiment are shown in Table I and described by groups below.

Experiment A—Group I

A group of eight, three months old rabbits were fed rabbit chow for twenty weeks. None of these developed atheromatous aortic lesions.

Experiment A—Group II

During a period of fourteen weeks, a group of twenty-one rabbits were fed 0.5 gm. cholesterol daily in addition to the basic diet. The results were as follows. No animal was free of atheromatous deposits. Three showed minimal involvement graded as one plus. Four showed two plus involvement. Five showed three plus involvement. Nine showed four plus involvement.

Counting this grading as the mathematical figures of 0, 1, 2, 3, and 4, the mean degree of involvement of the series would amount to 3.0.

Experiment A—Group III

Eight animals were given in addition to the basic diet, 0.5 gm. cholesterol per day with addition of 500 mg. choline chloride over a period of fourteen weeks. Five showed no atherosclerosis, one showed one plus, and two showed two plus involvement. The mean degree of severity was 0.62.

Experiment A—Group IV

Eighteen rabbits were fed in addition to the standard diet, 0.5 gm. cholesterol per day. This was mixed with one-half egg yolk and an extract of the lipocaic type, lot No. 1, prepared by Andrews, derived from 1 kilo of pancreas and found by analysis to contain 200 mg. choline. The results were as follows. No atheromatosis in seven animals; one plus atheromatosis in six animals; two plus involvement in two animals; three plus in two, and four plus in one. The mean degree of severity of atheromatosis is 1.1.

Experiment A—Group V

This group was made up of six rabbits which were fed in addition to the standard diet and 0.5 gm. cholesterol daily, a supplement of 75 mg. of choline chloride. The results were as follows. One animal showed no atheromatosis deposits. Three showed one plus involvement, and two showed two plus involvement. The mean degree of atheromatosis for the group was 1.2.

Experiment A—Group VI

Six animals were given cholesterol 0.5 gm. daily without egg yolk and lipocaic lot No. 2 prepared by Andrews. This extract was lower in choline content than the previous extract and again the extract of about 1 kilo of pancreas was given each day. The choline content was 75 mg. This extract proved totally ineffective. All animals showed atherosclerosis, one showing two plus involvement, three showing three plus involvement, and two showing four plus involvement. The mean degree of involvement was 3.2 or greater than that of the cholesterol controls animals. This extract was not as effective as pure choline in equal dosage.

Experiment A—Group VII

A group of six animals given 0.5 gm. cholesterol daily with the addition of 40 mg. choline chloride. Two animals showed no atheromatosis, one showed one plus involvement, two showed two plus involvement, and one three plus involvement. The mean degree of involvement was 1.3.

Experiment A—Group VIII

Twelve animals were given 0.5 gm. cholesterol per day plus lipocaic lot No. 3 prepared by Andrews. This was given in a dosage that contained 40 mg. choline chloride. After fourteen weeks, five animals showed no aortic atheromas, two showed one plus involvement, two showed two plus involvement, one showed three plus and two showed four plus involvement; a mean degree of involvement of 1.4; a performance distinctly better than that shown by lipocaic of lot No. 3—and about equal to that of choline in the same dosage.

Experiment A—Group IX

This group was made up of ten animals, given in addition to basic diet and cholesterol, choline chloride in a dosage of 10 mg. daily. The results were as follows. Three animals were free of atherosclerosis, three showed one plus involvement, two showed two plus involvement and two showed four plus involvement. The mean degree of involvement for the group was 1.3.

Experiment A—Group X

This group was made up of ten rabbits which were fed in addition to basic diet and 0.5 gm. of cholesterol daily, a supplement of lipocaic lot A prepared by Lilly and Company, 500 mg. of the powder being given daily to each animal. This was found to have a choline content of 10 mg. The results, after fourteen weeks, showed four animals free of atherosclerosis, four with one plus involvement and one with three plus and one with four plus involvement. This gave a mean involvement of 0.9. This was the second best performance of the pancreatic extracts tested and better than choline in doses of 10, 40 and 75 mg.

Experiment A—Group XI

In this group of eight animals, the dosage of choline was reduced to 2 mg. per day in addition to basic diet and cholesterol. This dosage of choline proved totally ineffective. Two animals showed two plus involvement, one showed three plus and five were found to have four plus involvement. The mean degree of involvement is 3.4 or somewhat worse than the cholesterol controls.

Experiment A—Group XII

Eight rabbits were given lipocaic lot No. B prepared by Lilly and Company in a dosage of 100 mg. per day, containing 2 mg. of choline. Basic diet and cholesterol were given as in other groups. After fourteen weeks, three animals were free of atheromas, two were found with one plus involvement, one with two plus and two with three plus involvement. This shows an average degree of atherosclerosis of 1.0, a much better performance than that given by 2 mg. choline and equal to the effects of choline in dosages as high as 40 mg. The results were not as good as that given by lipocaic lot No. A.

RESULTS OF DIETARY EXPERIMENT B

The animals so far discussed were three months old at the time experimental

feedings were started. The next series of animals was made up of somewhat older rabbits, six to eight months old at the beginning of the experimental diets. In this group, designated as Dietary Experiment B, the period of feeding was shorter, being only ten weeks. The animals of Dietary Experiment A were autopsied at six and one-half months of age, in this series at nine and one-half months of age. The results are shown in Table II and described by groups below.

TABLE II
DIETARY EXPERIMENT B
PREVENTION OF EXPERIMENTAL CHOLESTEROL ATHEROSCLEROSIS.
RABBITS SIX TO EIGHT MONTHS OF AGE.
PERIOD OF EXPERIMENTAL FEEDING TEN WEEKS.

Group	Number of Rabbits	Type of Diet and Daily Intake of Supplements	Degree of Atherosclerosis Produced (Number of Animals in Each Category) Zero	One Plus	Two Plus	Three Plus	Four Plus	Mean	Blood Cholesterol Changes: Average Initial Blood Cholesterol	Average Final Blood Cholesterol	Average Increase in Blood Cholesterol
I	9	Rabbit Chow only.	9	0	0	0	0	0	186	163	x0.88
II	18	Rabbit Chow, Cholesterol 0.5 gm.	2	3	2	7	4	2.4	107	1,593	x14.9
III	6	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 40 mgm.	0	1	3	0	2	2.5	124	1,440	x11.6
IV	6	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #C (Lilly) 750 mgm. contains 40 mgm. choline	0	2	4	0	0	1.6	125	3,390	x27.1
V	12	Rabbit Chow, Cholesterol 0.5 gm. Choline Chloride 10 mgm.	1	3	2	3	3	2.3	114	1,649	x14.4
VI	6	Rabbit Chow, Cholesterol 0.5 gm. Lipocaic #D (Lilly) 185 mgm. contains 10 mgm. choline.	4	1	0	1	0	0.7	159	2,163	x13.6
VII	18	Rabbit Chow, Cholesterol 0.5 gm. Betaine Hydrochloride 40 to 160 mgm.	2	3	5	7	1	2.1	134	1,489	x11.1
VIII	6	Rabbit Chow, Cholesterol 0.5 gm. Methionine 40 mgm.	0	2	0	2	2	2.6	143	1,594	x11.1
IX	6	Rabbit Chow, Cholesterol 0.5 gm. Inositol 40 mgm.	0	0	0	4	2	3.3	120	1,832	x11.1

Experiment B—Group I

This was a control group fed Purina Rabbit Chow only. Of the nine animals, none showed the presence of atherosclerosis at the time of autopsy, after ten weeks of this diet.

Experiment B—Group II

Eighteen animals were given 0.5 gm. cholesterol in addition to the basic chow diet. Of those, two showed no atheromas, three showed one plus involvement, two showed two plus involvement, seven showed three plus and four showed four plus aortic atherosclerosis. This is a mean involvement of 2.4 plus, somewhat lower than the control series of the younger animals.

Experiment B—Group III

This group of six rabbits was given in addition to basic diet and 0.5 gm. cholesterol, 40 mg. of choline chloride daily. After ten weeks, one animal was found to have one plus involvement, three showed two plus and two showed four plus involvement. This gives a mean degree of involvement of 2.5, a little worse than that of the cholesterol controls. The administration of 40 mg. of choline to these rabbits afforded distinctly less protection against atherosclerosis than the same dosage of choline given to the younger group of animals.

Experiment B—Group IV

Six rabbits were fed in addition to chow and cholesterol, lipocaic lot No. C prepared by Lilly and Company in a dosage of 750 mg. daily. This amount of extract was found to contain 40 mg. of choline. The results showed two animals with one plus involvement and four with two plus involvement giving a mean involvement of 1.6. This is some improvement over the cholesterol controls and the animals of this age group receiving 40 mg. of choline. The blood cholesterol was greater at the end of the experiment than in all other groups.

Experiment B—Group V

This group of twelve rabbits was given 10 mg. of choline chloride daily in addition to basic diet and cholesterol. One showed no atheromatosis, three showed one plus involvement, two showed two plus, three showed three plus and three showed four plus involvement. The mean degree of atheromatosis was 2.3 or not significantly different from the cholesterol controls.

Experiment B—Group VI

This group of six animals received in addition to basic diet and cholesterol 0.5 gm. daily, a supplement of lipocaic lot No. D prepared by Lilly and Company in a dosage of 185 mg. daily. This amount of extract contained 10 mg. choline. At autopsy, four animals were free of atherosclerosis, one showed one plus involvement, and one three plus involvement, an average involvement of 0.66. A noteworthy feature of this series of animals lies in the fact that this very favorable protective effect occurred in spite of a well marked increase in blood cholesterol. While not as high as the blood cholesterol of Group IV, the increase was well above that of the cholesterol control animals.

Experiment B—Group VII

This group of eighteen rabbits was given in addition to basic diet and cholesterol, betaine hydrochloride in a dosage of 40 to 160 mg. daily. Two animals showed no atherosclerosis, five showed one plus, five showed two

plus, seven showed three plus and one showed four plus involvement. The mean degree of involvement was 2.2 or only slightly better than the cholesterol controls and very close to the results secured with ten and 40 mg. of choline in this series.

We have not separated those rabbits receiving 40 mg. from those receiving 160 mg. since the degree of atheromatosis was no less in those receiving the higher dosage.

Experiment B—Group VIII

This group consisted of six animals given methionine in a dosage of 40 mg. daily in addition to basic diet and cholesterol 0.5 gm. daily. Two animals showed one plus involvement, two showed three plus and two showed four plus involvement. This is a mean degree of involvement of 2.6 and indicates no protection was afforded by methionine in this dosage.

Experiment B—Group IX

In this group, six rabbits were given inositol—40 mg. daily, in addition to basic diet and cholesterol 0.5 gm. daily. The autopsies showed four rabbits with three plus involvement, and two with four plus involvement. The mean is 3.3 or worse than the cholesterol controls.

These older animals of Dietary Experiment B appeared to derive some benefit from the administration of lipocaic, but none from choline in dosages of 40 and 10 mg. daily. Betaine, methionine and inositol in the doses used were without beneficial effect.

RESULTS OF DIETARY EXPERIMENT C

The third series of animals is designated Dietary Experiment C. These rabbits were six to eight months of age at the time observations were begun.

TABLE III
DIETARY EXPERIMENT C
PREVENTION OF EXPERIMENTAL CHOLESTEROL ATHEROSCLEROSIS WITH DOSAGE OF CHOLESTEROL ONE GRAM DAILY

Group	Number of Rabbits	Type of Diet and Daily Intake of Supplements	Degree of Atherosclerosis Produced (Number of Animals in Each Category) Zero Plus	One Plus	Two Plus	Three Plus	Four Plus	Mean	Blood Cholesterol Changes: Average Initial Blood Cholesterol	Average Final Blood Cholesterol	Average Increase in Blood Cholesterol
I	3	Rabbit Chow plus 1.0 gm. Cholesterol and 1.0 gm. crisco daily	0	0	0	0	3	4.0	126	933	x7.4
II	4	Rabbit Chow plus 1.0 gm. Cholesterol and 1.0 gm. crisco and 200 mg. lipocaic Lilly Lot #E daily	0	0	1	1	2	3.25	119	1,005	x8.4
III	5	Rabbit Chow plus 1.0 gm. Cholesterol and 1.0 gm. crisco and 200 mg. Choline Chloride daily	0	0	0	3	2	3.4	79	1,075	x13.6

The feeding program differed from the two preceding experiments in that the dosage of cholesterol was increased from 0.5 gm. daily to 1.0 gm. daily. One gram of crisco was also included in the daily ration. The experiment was begun with eighteen animals, but a respiratory infection reduced the number to twelve at the end of the ninety-day period of experimental feeding. The results are shown in Table III, and are described by animal groups below.

Experiment C—Group I

One group of three animals received only cholesterol and crisco in addition to the standard diet of rabbit chow. These all showed four plus aortic atherosclerosis after ninety days of experimental diet.

Experiment C—Group II

A second group of four animals received in addition to the standard diet, daily supplements of cholesterol and crisco, 200 mg. of lipocaic lot No. E prepared by Eli Lilly and Company. This lipocaic contained no choline. After ninety days of this dietary regime, one animal showed two plus atherosclerosis, one three plus and two four plus involvement—a mean degree of involvement of 3.25.

Experiment C—Group III

A third group of five animals was given the standard diet with the addition of crisco and cholesterol and 200 mg. of choline chloride. Three animals showed three plus involvement and two animals showed four plus involvement.

Hence, it appears that in the presence of the increased dosage of cholesterol, and the addition of crisco to the diet, lipocaic lot No. E in a dosage of 200 mg. daily proved ineffective in the prevention of atherosclerosis. Likewise, this increased dosage of cholesterol appeared to overcome any protective effect of daily administration of 200 mg. of choline chloride. The number of animals used in this experiment was too few to allow drawing final conclusions, but appears to indicate that the dosage of cholesterol has a distinct influence on the effectiveness of the agents used to prevent atherosclerosis.

In Table IV the combined results of all three dietary experiments (A, B, and C) are compared. The animals used in Dietary Experiments A and B, regardless of age, are placed together in groups depending on the type of therapeutic supplement used—the cholesterol feeding in each instance being 0.5 gm. daily. The animals of Dietary Experiment C are kept separate because of the higher cholesterol dosage, namely, 1.0 gm. daily. The following results are noted.

The control group of thirty-nine rabbits given 0.5 gm. of cholesterol daily in addition to the basic diet of rabbit chow show a mean degree of atherosclerosis of 2.7 plus.

Because of the wide scattering of results in this series, the standard deviation is high, being 1.2.

TABLE IV
COMBINED RESULTS OF DIETARY EXPERIMENTS A, B, AND C

Number of Rabbits	Type of Diet and Daily Intake of Supplements	Zero	One Plus	Two Plus	Three Plus	Four Plus	Mean
39	Rabbit chow Cholesterol 0.5 gm.	2	6	6	12	13	2.7
8	Rabbit chow Cholesterol 0.5 gm. Choline 2.0 mg.	0	0	2	1	5	3.4
6	Rabbit chow Cholesterol 0.5 gm. Inositol 40 mg.	0	0	0	4	2	3.3
6	Rabbit chow Cholesterol 0.5 gm. Methionine 40 mg.	0	2	0	2	2	2.3
18	Rabbit chow Cholesterol 0.5 gm. Betaine 40-1600 mg.	2	3	5	7	1	2.08
34	Rabbit chow Cholesterol 0.5 gm. Choline 10-40 mg.	6	8	9	6	5	1.9
36	Rabbit chow Cholesterol 0.5 gm. Lipocaic, Andrews, lots 1, 2, and 3 containing Choline 40-200 mg.	12	8	5	6	5	1.6
30	Rabbit chow Cholesterol 0.5 gm. Lipocaic, Lilly, lots A, B, C and D containing Choline 2-40 mg.	11	9	6	4	0	1.1
14	Rabbbit chow Cholesterol 0.5 gm. Choline 75-500 mg.	6	4	4	0	0	0.8
17	Rabbit chow only	17	0	0	0	0	0.0
3	Rabbit chow Crisco 1.0 gm. Cholesterol 1.0 gm.	0	0	0	0	3	4.0
5	Rabbit chow Crisco 1.0 gm. Cholesterol 1.0 gm. Choline 200 mg.	0	0	0	3	2	3.4
4	Rabbit chow Crisco 1.0 gm. Cholesterol 1.0 gm. Lipocaic, Lilly, lot E. 200 mg. contains no Choline.	0	0	1	1	2	3.25

Eight rabbits, given in addition to cholesterol and rabbit chow, a supplement of only 2.0 mg. choline daily actually showed more atherosclerosis than the controls, the mean degree of involvement being 3.4. Six animals given a supplement of 40 mg. of inositol daily were likewise more severely involved than the controls. Six animals given 40 mg. of methionine and eighteen

given a supplement of betaine, showed a degree of atherosclerosis very close to that of the cholesterol controls, namely, 2.3 plus and 2.08 plus, respectively.

The next group of thirty-four rabbits was given a therapeutic supplement of choline in very low dosage—i.e., 10-40 mg. daily. The degree of atherosclerosis in this group is 1.9.

The results of administration of three lots of pancreatic extract manufactured in our laboratories are indicated in the results found in the next group of thirty-six animals. The average degree of atherosclerosis was 1.6—still not quite differing from the cholesterol controls by as much as the standard deviation. The next group of thirty animals illustrates the result of administration of four lots of lipocaic manufactured by Lilly and Company. The mean degree of involvement was 1.1 plus, differing from the mean of the control series by a little more than the standard deviation. It is notable that the average results are better in this group than in the preceding one in spite of a lower choline content in the extract. The degree of protection afforded is better than that of choline in comparable doses.

The next group of fourteen animals was given choline chloride in doses between 75 and 500 mg. daily. This shows the best therapeutic response of all, namely, a mean atheromatous involvement of 0.8 plus.

Of the next group given rabbit chow only, none showed any atherosclerosis.

The three small groups of animals in Experiment C all of which were given 1.0 gm. of cholesterol daily—showed a high degree in atherosclerosis in each group—indicating failure of any therapeutic response from 200 mg. of choline or an equal amount of Lipocaic Lot No. E in the presence of this dose of cholesterol.

RELATIONSHIP OF THE LEVEL OF BLOOD CHOLESTEROL TO PRODUCTION OF ATHEROSCLEROSIS

No consistent relationship was observed between the level of blood cholesterol in the rabbits studied in these experiments and the development of arteriosclerosis. The older animals had higher initial average blood cholesterols—139 mg. per cent compared to 110 mg. per cent for the younger group.

The rise in blood cholesterol on straight cholesterol feedings is much greater in the older group. A fifteen fold increase in the case of the older animals compared to 8.5 fold increase in the younger. While no rabbit with less than 200 mg. per cent blood cholesterol developed atheromas, there was no consistent relationship between the height of blood cholesterol and development of atheromas, or degree of atheromatosis when present. In fact, the highest rise in blood cholesterol as already mentioned occurred in the group of older animals given 750 mg. daily of lipocaic (Lilly) lot No. C. Yet this group showed a relatively low incidence of atherosclerosis.

In the study reported in 1937, pancreatic extract prepared by Huber appeared to prevent the rise in blood cholesterol in animals fed cholesterol

TABLE V
EFFECT OF PANCREATIC EXTRACT (ANDREWS LOT #1) ON BLOOD CHOLESTEROL.

Number of Animal	Total Blood Cholesterol in Mg. per 100 cc. Before Cholesterol Feeding	Weeks after Cholesterol feeding was begun. 1	2	3	4	5	6	7	8	10	12	14
1	90	517	484*	222	100	171	180**	370	1,184	936	1,254	1,046
2	98	247*	212	109	247	296**	444	404	741	635	533	784
3	87	250	630*	70**	312	222	256	296	386*	178	256	222
4	101	205	300*	45	126	153	133	41	280	107	148	222
5	95	410*	97	650	533	853	1,111	863	1,150	1,368	1,333	1,269
6	56*	167	273	470	308	233	205	741	606	635	556	596
7	90*	247	392	950	1,520	1,111	1,538	1,269		683	741	827
8	36*	247	667	556	290	1,490	1,046	1,768	1,616	793	635	593
9	57*	370	483	198	136	484	370	680	467	769	889	952
10	78*	115	123	167	486	334	555	371	296	370	329	606

*Administration of Pancreatic Extract begun.
**Administration of Pancreatic Extract discontinued.

and egg yolk. The effect on blood cholesterol of the pancreatic extract which we have designated "Lipocaic Lot No. 1" prepared by Andrews is shown in Table V. It was fed with egg yolk to three-month-old rabbits and appeared to produce a fall in blood cholesterol during cholesterol feeding in some animals. When lipocaic was withdrawn, the blood cholesterol promptly increased to previous levels. Results of this type are seen in Table V, animals number one, two and three. Animal number four showed a sustained fall during lipocaic administration. Animal number five showed a very brief fall when lipocaic was started, but soon developed a marked increase in cholesterol. However, in sharp contrast with these results, animals number six, seven, eight, nine and ten showed but little effect on blood cholesterol level from administration of the same extract. Other lots of extract showed even less effect in reducing the level of blood cholesterol, and Lilly Lot No. C appeared to give rise to a significant increase in blood cholesterol.

SUMMARY

In summary, we have found in agreement with the work of Steiner[4,5] that choline chloride in a dosage of 500 mg. and 75 mg. daily offers some protection against development of atherosclerosis. Smaller doses of 40 to 10 mg. daily, while somewhat effective in three-month-old rabbits, failed to help animals six to eight months of age. Betaine hydrochloride in doses of 40 to 160 mg. daily and methionine and inositol in doses of 40 mg. daily appeared to be ineffective in prevention of atherosclerosis in six- to eight-month-old rabbits fed cholesterol in a dosage of 0.5 gm. daily.

Different lots of lipocaic, prepared by ourselves and by Lilly and Company, were found to vary in their content of choline. Some of these pancreatic extracts appeared to be entirely ineffective in preventing atherosclerosis, others appeared to offer some protective effect. Of those extracts that seemed effective, the results in some might be ascribed to their choline content, as in the case of Lot No. 1 prepared by Andrews. Other preparations appeared more effective than would be expected from the choline content of the extract.

No consistent relationship between height of blood cholesterol and degree of atheromatosis was observed. Some increase in blood cholesterol appeared to be necessary for atheromatosis to appear, but high levels of blood cholesterol were not invariably accompanied by the development of atheromas.

Some preparations of pancreatic extract appeared to lower blood cholesterol in some animals, but not in others. One preparation, in agreement with the findings of Vermeulen, Dragstedt, Clark, Julian and Allen, appeared to cause a marked rise in blood cholesterol, but atheromatosis was not severe in this series of animals.

We have no explanation of the erratic behavior of these pancreatic extracts. We have no evidence that the effects secured are due to the content of that substance which cures fatty liver in depancreatized dogs, since our extracts were not standardized in terms of this action.

We realize that the results secured in our studies are too irregular to warrant drawing any definite conclusions. We only offer this work to stimulate interest in the possibility that there may be something present in pancreas which probably is not choline and may differ from true lipocaic—which has some protective action in cholesterol atherosclerosis of rabbits.

Betaine, in a dosage of 40 to 160 mg. daily and methionine and inositol in doses of 40 mg. daily failed to show any evidence of protective effect against cholesterol atherosclerosis.

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GERIATRICS

Official Journal of the
American Geriatrics Society

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PROGRAM OF THE AMERICAN GERIATRICS SOCIETY

Sixth Annual Meeting

JUNE 2, 3, 4, 1949

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Notice to Non-Members
Please register before attending meetings. There is no charge. This program is your invitation.

THURSDAY, JUNE 2, 1949

8:00 P. M.—Business meeting. Fellows invited.

FRIDAY, JUNE 3, 1949

8:30 A. M.—Registration.

9:00 A. M.—Hollis E. Clow, M.D., Presiding.

1. The Influence of Advanced Age on the Clinical Characteristics of Coronary Disease.
   Louis B. Laplace, M.D., Associate in Medicine, Jefferson Medical College, Philadelphia.
2. Hypertensive Heart Disease in Older Patients.
   Gabriel F. Greco, M.D., Active Collaborator on Heart and Circulation, Biological Abstracts, Section B, Experimental Animal Biology Abstracts, University of Pennsylvania.
3. A Pediatrician's View of the Aging Process.
   Irving J. Wolman, M.D., Chief of Laboratory, Children's Hospital, Philadelphia; Editor, Quarterly Review of Pediatrics.
4. Cardiovascular Problems of the Older Age Group.
   Ernest P. Boas, M.D., Assistant Clinical Professor of Medicine, New York University.

INTERMISSION

Harold W. Lovell, M.D., Presiding.

5. Life Situations, Emotions, and Paroxysmal Cardiac Arrhythmias.
   Charles H. Duncan, M.D., Research Fellow in Medicine, Cornell University.
6. The Treatment of Thrombophlebitis.
   Otto Meyer, M.D., New York, New York.
7. The Physiological and Biochemical Changes Associated with the Aging.
   N. W. Shock, Ph.D., Chief, Cardiovascular Diseases and Gerontology Section Baltimore City Hospitals; U. S. Public Health Service.

FRIDAY, JUNE 3, AFTERNOON

2:00 P. M.—Joseph T. Freeman, M.D., Presiding.

8. Intestinal Obstruction in the Aged Patient.
   L. Kraeer Ferguson, M.D., Professor of Surgery, Graduate School of the University of Pennsylvania and Women's Medical College.
9. Gastric Ulcer in the Aged. By Levin, Erwin; Kirsner, Joseph B.; and Walter L. Palmer, M.D. Delivered by Walter L. Palmer, M.D., Professor of Medicine, University of Chicago.
10. Gynecological Aspects in Older Age.
    Mary DeWitt Pettit, M.D., Professor of Gynecology, Women's Medical College, Philadelphia.
11. Significance of Pain in the Back of Older Patients.
    LeRoy H. Sloan, M.D., Clinical Professor of Medicine, University of Illinois, College of Medicine.

INTERMISSION

C. Ward Crampton, M.D., Presiding

12. Anesthesia in the Aging Group.
    William Anthony Weiss, M.D., Director of Anesthesia, Women's Medical College Hospital; Associate in Anesthesia, Women's Medical College.
13. The Treatment of Leukoplakia and Kraurosis Vulvae.
    Charles L. Buxton, M.D., Associate Professor of Clinical Obstetrics and Gynecology, Columbia University, College of Physicians and Surgeons, New York.
14. Reactions Attributed to Administration of Thiamin Chloride (Synthetic Vitamin B_1).
    C. C. Weigand, M.D., Indianapolis, Indiana.

AMERICAN GERIATRICS SOCIETY ANNUAL DINNER

INFORMAL

FRIDAY, JUNE 3, 1949

6:30 P. M.—Cocktails.

7:30 P. M.—Dinner.

Hollis E. Clow, M.D., Toastmaster.

The Future of Geriatrics—Willard O. Thompson, M.D., Clinical Professor of Medicine, University of Illinois, College of Medicine.

Approaches to Security—Edward L. Bortz, M.D., Clinical Professor of Medicine, Graduate School, University of Pennsylvania; Chief in Medicine at Lankenau Hospital.

Guests and non-members are invited to attend. Please make reservations in advance with Dr. Richard J. Kraemer, 588 Broad Street, Providence 7, Rhode Island. Dinner tickets, $7.00, including cocktails and gratuities.

SATURDAY, JUNE 4, 1949

9:00 A. M.—Elwyn Evans, M.D., Presiding.

15. Paranoid Reactions in the Aging.
    Edward B. Allen, M.D., Senior Assistant Psychiatrist New York Hospital, Westchester Division, Instructor in Psychiatry Cornell University Medical School; and Hollis E. Clow, M.D., Director of Laboratories and Internist, New York Hospital, Westchester Division.
16. François Ranchin: Early Contributor to Geriatrics.
    Joseph T. Freeman, M.D., Associate in Medicine, Women's Medical College Hospital.
17. The Causes of Morbidity and Mortality in 800 Geriatric Cases: A Clinical and Pathological Study.
    Francis Murphy, M.D., Professor and Head of the Department of Medicine, Marquette University, School of Medicine; Medical Director Milwaukee County Hospital; Chief of Staff, St. Joseph's Hospital, Milwaukee, Wisconsin.

INTERMISSION

Elizabeth Mason-Hohl, M.D., Presiding

18. Gonadal Disturbances After Forty-Five.
    Willard O. Thompson, M.D., Clinical Professor of Medicine, University of Illinois, College of Medicine.
19. The Physiological Aspects of Emphysema and Treatment.
    Hurley L. Motley, M.D., Leonard P. Lang, M.D. and Burgess Gordon, M.D., Clinical Professor of Medicine, Jefferson Medical College, and Director, Barton Memorial Division, Jefferson Medical College Hospital.
20. The Emotional Hazards of Senescence.
    Edward J. Stieglitz, M.D., Attending Internist Suburban Hospital, and Chestnut Lodge Sanitarium, Washington, D. C.
21. Endocrine Treatment of Alcoholism.
    John Tintera, M.D., New York and Harold W. Lovell, M.D., Associate in Neurology, Flower and Fifth Avenue Hospitals, New York.

SATURDAY, JUNE 4, AFTERNOON

2:00 P. M.—G. W. Ainlay, M.D., Presiding.

22. Hospital versus Home Treatment of the Aged.
    Malford Thewlis, M.D., and E. T. Gale, M.D., Wakefield, Rhode Island.
23. Clinical Evaluation of the Geriatric Patient.
    William B. Kountz, M.D., Assistant Professor of Clinical Medicine, Washington University, School of Medicine, St. Louis, Missouri.

24. The Connecticut Way—Practical Aspects of Rehabilitation.
Joseph Howard, M.D., Howell Creadick, M.D., and A. J. Tutles, M.D., Consulting Physician Department of Public Welfare of Connecticut.
25. A Standard Nutritional Geriatric Survey at the Age of Fifty.
C. Ward Crampton, M.D., Chairman, Committee on Geriatrics and Gerontology, Medical Society of the County of New York.

INTERMISSION

Miss Margaret Wagner, Presiding.

26. The Use of Digitalis Drugs in the Aged. Albert Mueller-Deham, M.D., Attending Physician Goldwater Memorial Hospital, City of New York.
27. Hormone Therapy in the Aging.
Thomas H. McGavack, M.D., Professor of Medicine at the New York Medical College.
28. The Span of Life.
William H. Kehlman, Administrator Esplanade Nursing Home; Editor, Macrobiotics (The Art of Prolonging Life).
29. Essential Partnership of Medical and Social Work in the Aging Population.
Miss Ollie Randall, Consultant in Service for the Aged, Community Service System of New York City.
Discussor: Miss Margaret Wagner, Director, Benjamin Rose Institute, Cleveland, Ohio.

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A Geriatric Board

In these days of specialization, it is to be expected that the question of a geriatric board would arise. A "diplomate in geriatrics" has been suggested. This has been proposed in view of the possibility of the government health program. There have been suggestions that the American Geriatrics Society arrange for such board examinations before any health bill can be passed.

There is no proof that the government health program will be passed at this time. Even if it were, there are few trained persons who could handle the situation. As a result, there would be medical confusion for at least five years. During this time there would be many changes made in the medical program. There would be plenty of time to make any changes in our approach to the situation.

Geriatrics, as the American Geriatrics Society sees it, is not a special branch of medicine; it devotes special attention to the aging process and the care of the aged. It is a part of internal medicine; therefore, the logical thing

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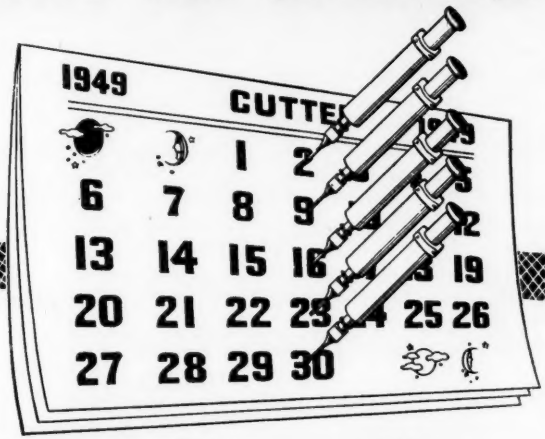

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for those who wish to pass board examinations would be to contact the board of internal medicine. This is a desirable thing to do; not everyone can do it. Those who do not, and who still study and keep up to date can do well in their practices. A diplomate certificate will not give a man common sense and experience: these two things are demanded by patients.

My own impression is that geriatrics begins at twenty. At this time preclinical medicine (preventive geriatrics) begins and extends to about forty. This is the period in which the physician is searching for predisease or conditioning periods of disease. Working on disease possibilities may ward off actual diseases of old age. The geriatrics period (from forty on) has not only a preventive program but the actual care of the diseases of advancing years. Thus the geriatrician begins his work at twenty and carries on his health program: advising people about proper nutrition, weight, exercise, recreation — in fact anything which may ward off disease later in life.

This is all the work of the internist. If a person wishes to specialize in geriatrics, he must first be a good clinician. He should spend at least five years in general practice. Ten years would be better.

M. W. T.

How Long Will Your Heredity Clock Tick?

THE WHOLE WIDE WORLD seems to have become geriatrics conscious. How long will you live? was the opening sentence of a recent article by Alton L. Blakeslee, a science reporter of the associated press. Barring accidents, a man will live until his clock runs down is the unique answer. The life clock is set by heredity which is the basis for saying, "For a long life, choose long-lived parents and ancestors."

We have had many articles in our journal devoted to diet and hygienic measures that might increase the life span and make old age comfortable. We have admitted that the increased span of human life statistically recorded during the past few decades was chiefly attributable to progress in child care with resultant decrease of infant mortality. We have denied that "life begins at forty" and quoted Charlie Mayo's chuckling remark that "middle age is the time you quit growing at each end but continue in the middle." Life insurance companies have also tackled the problem somewhere about the middle as evidenced by a familiar quotation "if you increase the waist line, you decrease the life line." In more recent meetings of our society there has been a growing tendency by Dr. Thewlis and some other members to stress the need of beginning geriatric care as "preventive geriatrics" at an earlier time than had formerly been thought of, and at a recent meeting someone gave voice to the expression that geriatric care should begin where pediatrics leaves off.

It is the business of life insurance companies to evaluate the expectancy of life in the case of each applicant. The examiner makes special note of the family history, ancestry and heredity. Now we are determined to do likewise and include eugenics in our geriatric scope. And why not?

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DIGESTS *from Current Literature*

The Care of the Elderly Bronchitic Patient.

HECTOR GOADBY, M.D., F.R.C.P., *The Practitioner*, 161:446-448 (Dec.), 1948.

Early and vigorous chemotherapy and good nursing are essentials in treating respiratory infections of old people. Bronchial conditions may range from a mild chronic cough to bronchopneumonia. With congestive heart failure prognosis is poor.

The chronic bronchitic should be encouraged to lead as active a life as possible, with fresh air daily and a rest period after each meal. Gradual weight reduction, if necessary, is advised by eating half-portions of normal meals. Night coughing is controlled by a linctus; expectorants and antispasmodics are reserved for more serious crises. A mild dry climate is ideal; at least cities and crowds should be avoided.

Hector Goadby, M.D., treats even minor upper respiratory infections or acute exacerbations of the bronchitis with bed rest. If fever develops, sulphonomides or penicillin are indicated. Sulphamerazine, 4 gm. initially, 1 gm. eight-hourly, is advised for mild cases. Coughs are often relieved by vaporizing with eucalyptus oil, 2 minims (0.12 c.cm.), pine oil, 2 minims (0.12 c.cm.), and compound tincture of benzoin, 60 minims (3.5 c.cm.) per kettleful of water. Penicillin vapor given by means of a special vaporizer is effective for gross infections.

If pleural pain, high fever or signs of consolidation appear, penicillin, 30,000 units or more every three hours, is suggested. Lobelia and stramonium B.P.C. is an effective compound. For relief of spasm, ephedrine is given in one-half grain doses or aminophilline, 0.1 to 0.2 gm. t.d.s.

If cardiac failure sets in, with orthopnea, distress, peripheral edema, high venous pressure and a tender liver, the situation is serious. Digitalis and morphine are dangerous. Many patients will not tolerate an oxygen mask or intranasal catheter. Therapeutic agents are restricted to barbiturates for sedation and mercurial diuretics, such as mersalyl, given intramuscularly every second or third day, for edema. If auricular fibrillation develops, an initial dose of digitalis folia, one-half grain (32 mgm.) or digoxin, 0.25 mgm. t.d.s. by mouth, is indicated. Subsequent doses depend on the apical heart rate. Pulse deficiency should be eliminated so far as possible.

Haemoptysis, if at all copious in mild bronchial conditions, is an indication for bronchoscopy to look for a neoplasm. Chronic bronchitis does not predispose to carcinoma but bronchial carcinoma being relatively common, may arise coincidentally.

Adjustments to Age.

WINGATE M. JOHNSON, M.D., F.A.C.P., *Med. Ann. D. C.*, 17:664-701 (Dec.), 1948.

While the body slows down in the second forty years, the well-trained mind preserves its vigor. Recreation is essential but exercise may be comfortably ignored.

Most workers could carry on long after the customary retirement age. Enforcing retirement on a man with full mental capacity is traumatic and may speed the aging process. The folly is also economic. An insurance com-

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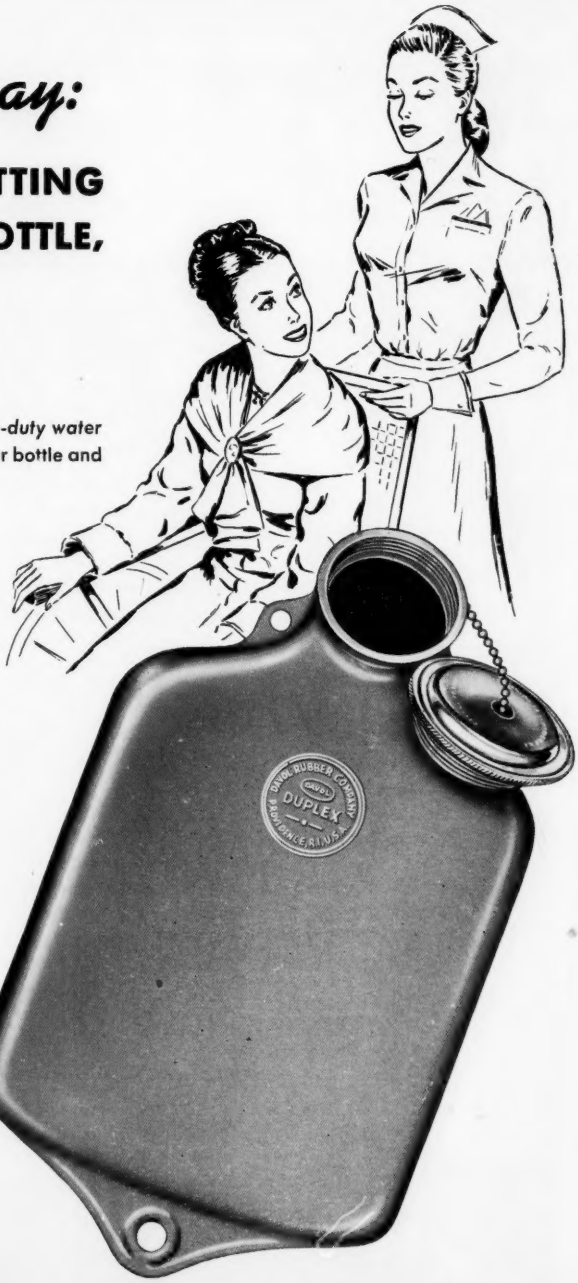

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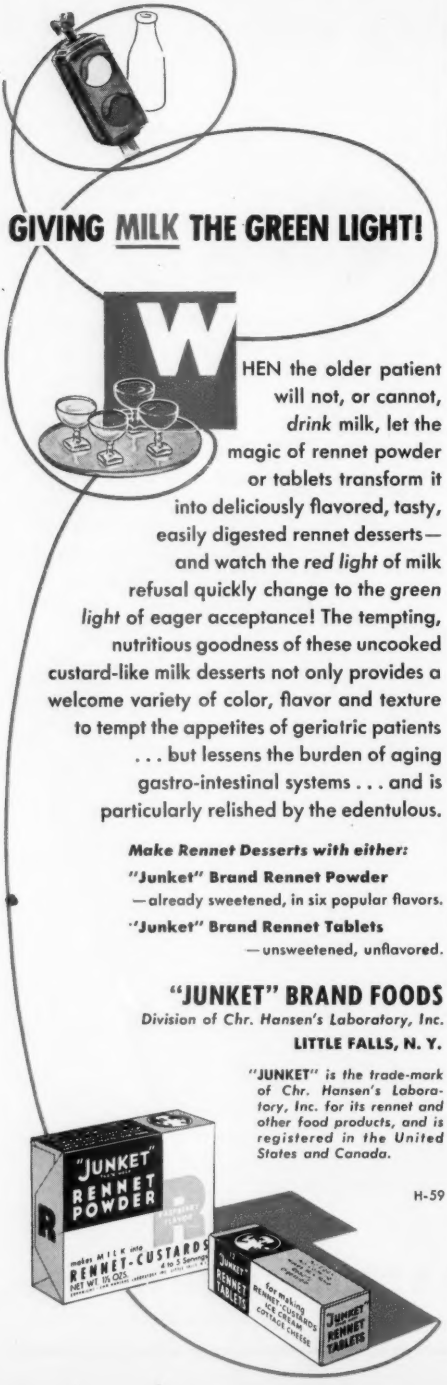
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pany estimates that by 1970 as many employees will be on pension as on the job. Wingate M. Johnson, M.D., is encouraged by the reversal, in North Carolina, of the ruling that state employees must be retired at 70. R. J. Reynolds Tobacco Company has increased retirement age from 65 to 70 and permits working longer.

After middle age the body resists infection better; migraine usually disappears, diabetes is less severe, cancer spreads more slowly. Eyesight can usually be restored by bifocals; hearing aids are improving—and can be turned off at will. Older patients are now known to tolerate surgical procedures well. Spending too much time in bed after an illness or operation is to be avoided.

A balanced diet helps avoid constipation and the serious threat of obesity. Vegetables, fruits and meats are often neglected. Dietary advice may be summed up: Don't eat too much carbohydrates, fat or protein, don't eat too much — "period." Tea, tobacco, coffee and alcohol in moderation are not harmful and the latter two are vasodilators.

Of Woodrow Wilson's cabinet, the only member to scorn Walter Camp's "daily dozen" was Josephus Daniels, who, at 85, outlived all the others. Chauncey Depew, who reached 93, took his exercise acting as pallbearer for friends who exercised. An ordinary day's exercise is often greater than recognized. Going upstairs is fifteen times and going downstairs five times the equivalent of walking on level ground. Relaxation through hobbies is important. A midweek afternoon off and frequent week-end holidays are helpful supplements to normal vacations.

Psychological adjustment to advancing years is eased by recognition that the mind at forty is at its peak and remains an adaptable, first-class machine till seventy or longer. Old friendships should be kept up and new ones made, especially among young people. Authority and responsibility should be delegated to younger associates. Time

Since cardiac anoxia resulting from inadequate coronary circulation is regarded as the chief causative factor in distressing anginal attacks, the principal aim of symptomatic treatment is to broaden the channels of blood circulation, thus expediting vital oxygen transfer.

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is then available to develop wide interests and new skills for hand and brain. To cultivate equanimity and acceptance of the world, Sir William Osler's "A Way of Life," with its emphasis of "living for the day only," is recommended. Boring reminiscences of the good old days is not a habit of the older person who has learned to look to the future and be receptive to new ideas.

The Grave Prognosis of Appendicitis in the Aged.

DONALD C. COLLINS, M.D., *Ann. West. Med. and Surg.,* 2:193-205 (May), 1948.

The diagnosis of acute appendicitis is more difficult and the mortality progressively greater the older the patient. Early and adequate treatment, states Donald C. Collins, M.D., of Los Angeles, Calif., is imperative.

The average incidence of appendicitis in patients over 40 years of age is 6.71 per cent. The average mortality is 1.30 per cent. The mortality increases from 15.46 per cent in the fifth decade to 31.07 per cent in the seventh decade.

Increasing delay between onset of symptoms and operative intervention causes progressive sky-rocketing of the mortality.

Atypical symptoms are frequent and too often result in erroneous diagnosis. The resultant delay in instituting treatment frequently is fatal.

Failure to perform appendectomy in the quiescent interval following an acute attack leads to disaster.

The fatal incidence also rises rapidly as a result of self-medication and taking of laxatives by the patient before hospital entry.

Causes of death are: 1) unfortunate choice of incision, 2) intraperitoneal drainage, 3) secondary operations to correct needless complications, 4) postoperative ileus, 5) postoperative bowel obstruction, 6) pulmonary embolism.

The McBurney incision is the safest and least liable to the development of postoperative morbidity. The mortality

INOSITOL

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A REVIEW OF RECENT PUBLICATIONS OF CLINICAL INTEREST

I

Recently published data concerning the lipotropic action of inositol in both experimental animals and human subjects, and the broad clinical implications of these findings, prompt this series to keep the physician informed on this important subject. As the results of further clinical studies are published, the findings will be presented. This member of the vitamin B complex appears to possess significant therapeutic potentialities, and intensive research is being conducted in many quarters to establish indications for its use.

In a study of various lipotropic agents administered to 111 patients with atheromatous disease it was observed that inositol resulted in an average reduction of blood cholesterol and cholesterol esters of 19 per cent and 17 per cent respectively. The patients with hypercholesterolemia manifested this drop in blood cholesterols in a period of 6 to 10 weeks. The same individuals showed clinical evidence of atheromatous coronary artery disease. The author points out that lipotropic agents in general "warrant further study as promising therapeutic agents."[1]

Inositol was administered to a 37 year old patient with generalized xanthomatous cutaneous lesions. Collateral therapy consisted of a low fat, low cholesterol, high protein, high carbohydrate diet, and administration of choline and methionine. Inositol alone or inositol and diet markedly reduced total blood lipids and also phospholipids, but cholesterol esters and total cholesterol remained high. Despite these objective changes and symptomatic improvement of the patient the author warns that lipotropic activity can be properly evaluated only after prolonged study.[2]

Goldstein and Rosahn have successfully employed inositol combined with choline in the treatment of patients suffering from cirrhosis of the liver in an advanced stage.[3] More recently, Broun[4] reported complete recovery of a patient with advanced hepatic cirrhosis, who received daily doses of 1.0 Gm. inositol, 1 Gm. choline, and 2 tablets of fortified yeast. Previous attempts to control ascites with choline and liver extract therapy had failed. The dietary regimen was kept unchanged.

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rate following the use of the McBurney incision is one-fourth to one-fifth of that following the use of other more medially placed incisions.

In case of doubt as to the possible presence of appendicitis, in an aged individual, exploration of the ileocecal juncture through a McBurney incision is better surgical judgment.

Chemotherapeutic and antibiotic agents are important contributions in effecting reduction in mortality.

Codeine is substituted for morphine as quickly as possible. Slow acting barbiturates in small doses are recommended.

Electrolyte and water balance, the use of whole blood is stressed in both the preoperative and postoperative periods.

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GERIATRICS

Bacterial Endocarditis in the Elderly*

A Report of 94 Autopsied Cases

Eugene F. Traut, M. D.,† *J. Bailey Carter,* M. D.,††
Stanley H. Gumbiner, M. D.,‡ *and Raymond N. Hench,* M. D.§

ONE OF THE earliest descriptions of bacterial endocarditis is that of Rokitansky,[1] in 1855, who described round, sausage-shaped vegetations of stiff, hyaline, albuminous matter enclosing a multitude of small granules, i.e., bacteria. Virchow,[2] in 1856, related the condition to infarcts in various parts of the body and thereby developed his theory of embolism, rated by many as his greatest single achievement. Hektooen[3] states that conclusive evidence of the association of bacteria with ulcerative endocarditis was offered by Winge[4] and Heiberg,[5] in 1869, with the first convincing description of streptococci in endocardial vegetations. Klebs,[6] in 1878 and Koster,[7] in 1886, confirmed these findings. Harbitz,[8] in 1899, and Bartel,[9] in 1901, convinced that some lesions were in the "healing stage" and free of bacteria, gave the first ray of hope for victims of this disease. Billings,[10] in 1909, reported 14 cases with positive blood cultures in every patient. Libman,[11] in 1912, demonstrated characteristic lesions in patients with negative antemortem blood cultures. Le Count,[12] Jaffe,[13] Capps[14] and others, have since made outstanding contributions.

LITERATURE

The literature to 1940 conveys the impression that subacute bacterial endocarditis is predominantly a disease of the younger age group. Willius[15] states

*Read before the Regional Meeting of the American College of Physicians, Milwaukee, Wisconsin.

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§Resident, Department of Medicine, Cook County Hospital, Chicago.

that "in the vast majority of cases the patients are less than 50 years of age."

A report of 50 necropsied cases,[16] of subacute bacterial endocarditis, lists 6, 3, 9, 17, 10 and 5 as the number of patients in each decade to age 60 years. There were 28 males and 22 females. All showed previous myocardial damage; 23 with healed rheumatic heart disease. There were no congenital or syphilitic lesions. The mitral valve was involved in 21; the aortic in 10 cases. Antemortem blood cultures were positive in 23; sterile in 10 and not taken in 17 cases. Three hearts revealed healed vegetative endocarditis with active rheumatic endocarditis as evidenced by verrucae. Two others showed healed vegetative endocarditis.

In 58 AUTOPSIED cases[17] of subacute bacterial endocarditis, of all ages, over 60 per cent had rheumatic heart disease. The major involvement was: mitral valve, 21; aortic valve, 10; mitral and aortic, 14; tricuspid, 2; mitral and tricuspid, 2; and one each of various multi-valvular lesions, associated with ductus arteriosus in one and with septal defect in 3 instances. Recent and/or old myocardial infarcts were found in 25 per cent of the 58 cases.

In a series of 28 autopsies[18] of subacute bacterial endocarditis, over 40 years of age, 23 were men and 5 were women. The two oldest patients in this series were women, 70 and 72 years of age. The antemortem diagnoses were correct in 14 cases. Vegetations occurred on the aortic and mitral valves 9 times; on the mitral 8 times; on the aortic 7 times; on the aortic and tricuspid twice and in two cases, on the aortic, mitral and tricuspid valves. Vegetations occurred on valves deformed by rheumatism in 16 (57 per cent); on arteriosclerotic deformities in 7 (25 per cent); on luetic deformities in 2 and on congenital bicuspid aortic valves in 3 (11 per cent)*; one of these showing also vegetations on the mitral valve. The heart was enlarged in 24 cases. Blood cultures were positive in 12 of 23 cases: viridans, 8; streptococcus hemolyticus, 2; pneumococcus, 2. The spleen was enlarged in 26 and infarcted in 17 cases.

Zeman[21] reports 14 necropsied cases of subacute bacterial endocarditis over 60 years of age. He found rheumatic heart disease in 10 cases.

PROBLEM

Interested in the incidence of endocarditis in the elderly, the total number of pathologically proven cases in the Cook County Hospital over a period of eleven years was reviewed. Endocarditis was divided anatomically according to the character of the vegetations and the presence or absence of valvular necrosis. The abacterial group with its small, pearly, hard lesions is also called rheumatic, verrucous or benign. The abacterial group includes the lesions described by Libman and Sacks in lupus erythematosus.[22] The bacterial group includes subacute or vegetative endocarditis, endocarditis lenta, with large, soft, villous lesions commonly associated with the strep-

*Koletsky[19] agrees with Gross[20] that this valve lesion is not congenital but acquired and is nearly always of rheumatic origin and that this etiologic factor explains its frequent association with superimposed subacute bacterial endocarditis.

tococcus viridans. The other great group of bacterial endocarditis is called acute, ulcerative, necrotizing or malignant and is usually due to bacteria of greater virulence such as the gonococcus, pneumococcus, streptococcus hemolyticus, staphylococcus aureus and the various fungi. Authorities agree that the boundaries between these groups are not sharp. The allocation of a given lesion as verrucous or vegetative is admittedly difficult. Again, the distinction between vegetative and ulcerative endocarditis is chiefly quantitative. An organism may be reported in one instance as the cause of subacute or vegetative endocarditis, a proliferating lesion and in another case as the cause of an ulcerative or necrotizing endocarditis. The various types of endocarditis may occur in the same individual on the same or on different valves.

PATHOLOGY

Of a total of 13,661 autopsies at the Cook County Hospital from 1935 to 1946, 299 or 2.2 per cent, revealed active endocarditis. Of the 299, 112 (38 per cent) were over and 187 (62 per cent) under 45 years of age.

If the 299 cases of active endocarditis of all ages, 221 (87 per cent) were bacterial. Of the bacterial endocarditis group 94 (42 per cent) were over and 127 (58 per cent) under 45 years of age.

Of the 299 cases 78 were verrucous; active or recurrently active cases. Of these 78 acute rheumatic cases, 18 (23 per cent) were above and 60 (77 per cent) below 45 years of age.

The 94 cases of bacterial endocarditis included 75 males and 19 females; a ratio of 4:1.* On the basis of 45,000 admissions to Cook County Hospital the ratio of males: females was 1:1.**

Of 18 blood cultures 6 were positive. The clinical diagnosis of bacterial endocarditis was correct in 12 of the 94 autopsied patients over 45 years of age.

Of the 94 cases of bacterial endocarditis over 45 years of age, 54 were vegetative, 15 were ulcerative and 25 showed combined ulcerative and vegetative lesions. In these 94 cases, 3 had active bacterial endocarditis engrafted on active rheumatic endocarditis. Von Glahn and Pappenheimer[23] insisted that this relationship obtains in all cases; an idea never substantiated.

Of these 94 cases of bacterial endocarditis 57 showed rheumatic scars. Our criteria for healed rheumatic lesions were: adhesions of cusps; shortened, thickened chordae tendinae; foreshortened, thickened valve cusps. Aortic syphilis occurred 12 times. Arteriosclerotic heart disease was recognized in 5 cases. Only 2 congenital defects were noted. In 18 patients antecedent heart disease could not be proved. Absence of a predisposing factor was three times more common in ulcerative than in vegetative endocarditis.

The valvular involvement in the 94 cases of bacterial endocarditis was: aortic, 46; mitral, 31; with one each of aortic and pulmonic; aortic, pul-

*Jones states that more women than men have rheumatic fever.[24]

**Men predominate in all the series of bacterial endocarditis reviewed.

monic and tricuspid; tricuspid. Of the 18 abacterial cases over 45 years of age, the mitral valve was involved in 10; the aortic in 1; the mitral and aortic in 6 and all valves in one instance. The predominant involvement of the aortic valve in bacterial and of the mitral valve in the rheumatic cases in the older age group is emphasized.

Emboli were distributed as follows: petechiae, 74 (skin 60, subconjunctival, 14); spleen, 39; kidneys, 36; lungs, 8; stomach, 8; left ventricle with infarction, 6; brain, 6; liver, 4; mesenteric vessels, 2 and to a meningeal artery, an iliac artery, the aorta near its bifurcation, esophagus, gall bladder, hands and feet in one instance.

Pericarditis was present 13 times (fibrinous, 8; adhesive, 2; serous, 1; serosanguinous, 1 and purulent, 1). Syphilitic mesaortitis was found in 12; 3 with and 9 without aneurysm. Arteriosclerotic heart disease was present in 5; acute myocarditis in 4; myocardial abscess in 2; congenital septal defect in 1; aberrant chordae tendinae in 1; meningitis in 11 (septic in 10 and luetic in 1); encephalitis in 2; bronchiectasis in 4; cirrhosis of liver in 4; hypernephroma in 2; cancer of the larynx, stomach and prostate, and mastoiditis, empyema and purulent arthritis in one case each.

Pulmonary tuberculosis occurred 7 times in this series of 94 cases of bacterial endocarditis over 45 years of age. The tuberculosis was active in

TABLE I

Total Autopsies Studied 13,661

Active Endocarditis (Total all ages)			299
Above 45 yrs.			112
Below 45 yrs.			187
Rheumatic Endocarditis			78
Above 45 yrs.			18
Below 45 yrs.			60
Bacterial Endocarditis			221
Above 45 yrs.			94
Below 45 yrs.			127
Of Bacterial Endocarditis over 45 yrs.	Males / Females = 4 / 1		
Active Endocarditis over 45—112 Cases			
Verrucous	18		
Mitral	10		
Aortic	1		
Mitral-Aortic	6		
Bacterial	94	Vegetative	54
		Ulcerovegetative	25
Aortic	46	Ulcerative	15
Mitral	31		
Aortic-Mitral	10		
Bacterial Endocarditis over 45—94 Cases			
Predisposing Lesions			
Rheumatic Deformities			57
Mesaortitis Luetica			12
Arteriosclerosis			5
Congenital Defect			2
No Predisposing Lesion			18
Complications			
Pericarditis			13
Meningitis			11
Tuberculosis			7
Bronchiectasis			4
Encephalitis			2

2 cases; one of these cases having mitral stenosis. There were 2 questionably active tuberculous cases without mitral stenosis. There were 3 cases of healed tuberculosis, 2 with mitral stenosis.

DISCUSSION

Our findings confirm the impression that active endocarditis seldom, if ever, develops in a normal heart. Antecedent injuries or abnormalities are almost a sine qua non in bacterial endocarditis regardless of the nature of the infecting agent.[25] In our series, rheumatic scars were found to be the most common localizing factor.

Our findings regarding vascular syphilis as a predisposing factor[26] in subacute bacterial endocarditis may be influenced by the notably high incidence of lues in this hospital.[27]

The paucity of congenital lesions in this series is to be expected from the experience of others.

Our findings bring out the selectivity of abacterial endocarditis for the mitral valve. This contrasts with the predilection of bacterial endocarditis for the aortic valve.

Infarction of the stomach and of the myocardium was not anticipated.

Our findings of pericarditis in 13 of 94 instances of subacute bacterial endocarditis over 45 years of age are consistent with recent findings. They disprove the old idea[28] that pericardial involvement predominates in rheumatic heart disease and that in subacute bacterial endocarditis the endocardium is much injured, the myocardium slightly and the pericardium not at all; that the difference between rheumatic and infectious endocarditis is very definite.[16]

SUMMARY

The finding of 2.2 per cent of active endocarditis, in 13,661 autopsies, agrees with previous figures.

Bacterial endocarditis commonly occurs in the elderly patient.

Active rheumatic endocarditis is uncommon but not rare after 45 years of age.

The vegetative or subacute form of bacterial endocarditis was twice as common as the acute or ulcerative type.

Almost two-thirds of the cases of bacterial endocarditis showed rheumatic scars.

Inability to find a predisposing factor for bacterial localization was three times more common in ulcerative than in vegetative endocarditis.

In this series of bacterial endocarditis the ratio of male to female was 4:1.

Aortic valvulitis predominated in the group of bacterial endocarditis.

Mitral valvulitis predominated in the group of active rheumatic endocarditis.

Congenital lesions were not important predisposing factors in this series of bacterial endocarditis in the elderly.

Our findings correct the conception that endocarditis is uncommon in the elderly.

Failure to recognize its important incidence in the elderly may cause the correct diagnosis of active endocarditis to be overlooked.

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The Annual Meeting of the American Society for the Study of Arteriosclerosis will be held November 5, 6 and 7 at the Hotel Knickerbocker, Chicago.

Heat Reaction States in the Aged

Louis Friedfeld, M.D., F.A.C.P.*

THE ADVENT of sulfonamides, antibiotics, heparin and dicoumarin within the past decade has materially altered the pattern of mortality statistics among the aged. Much effort has been devoted to developing more effective methods of treating infectious diseases and to preventing and controlling thrombo-embolic states. As a result, these conditions are becoming less prominent causes of death in the later years of life. However, less attention has been directed toward other conditions that have been responsible for significant mortality, such as the extreme variations in environmental temperature. The aged in particular are affected by both severe cold and intensive heat. This is especially true in the temperate zones where both extremes produce distinctive pathologic states.

Vulnerability to winter hazards is increased by chronic bronchopulmonary disease, cerebral, coronary and peripheral arteriosclerosis, and osteoporosis, which result in serious respiratory tract infections, coronary insufficiency and the anginal syndrome, peripheral vascular disturbances, and disabling fractures due to falls on iced pavements. Where feasible, it is commonly recommended that the aged, and others suffering from vascular or debilitating diseases, spend the winter in warmer climate. For those remaining at home, the effects of winter exposure may be reduced by remaining indoors.

There is less opportunity to escape summer heat. A fortunate few may air-condition their homes or seek relief in northern areas, but these solutions are not available to the greater number of those who may be most seriously affected. Also, the practice of seeking the coolness of mountain resorts may be limited by the effects of reduced atmospheric oxygen tension on the anoxia already existing as the result of vascular impairment.

The records of institutions caring for the aged and infirm reveal increased morbidity and mortality during extreme summer weather. Heat reaction states have been studied at the Home of Old Israel in New York City since the summer of 1937, when eight deaths occurred among the 200 residents during a twenty-four-hour period. Since early signs exist for the recognition of these potential medical emergencies and effective measures are available for their treatment, further awareness of the underlying physiology and pathologic variations is desirable.

PHYSIOLOGY OF HEAT REGULATION

Man is homothermic, his body temperature being relatively constant and independent of the surroundings. This temperature is normally maintained by balance of heat production and heat dissipation. Among the central nervous

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system elements operating in this equilibrium are the heat regulating center of the hypothalamus and the vasomotor apparatus. These are effectuated through the control of muscular contractions, sweating, and the physical factors of conduction, convection and radiation at the body surface.

HEAT PRODUCTION results from oxidative processes in the tissues, the greater portion being due to muscular contractions. When an acute need exists, shivering occurs. Dissipation of heat, under ordinary conditions, is effected by radiation (55%), conduction and convection (15%), and water vaporization of the skin and respiratory tract (27%). Under conditions which tend to increase the body temperature, these proportions change. The importance of sweat evaporation increases as the surrounding temperature rises, until it becomes the sole operative mechanism as the environmental temperature exceeds the skin surface temperature.[1,2] With each liter of sweat that is vaporized, 580 calories are dissipated.[3]

The role of the individual heat regulating mechanisms is affected by environmental conditions, water and electrolyte availability, and the efficiency of the vasomotor and sweating centers. The processes are more effective when the temperature, humidity, and motion of the ambient air are controlled. When these cooling mechanisms fail to dissipate the excess heat that may be generated from within, or acquired from without, the body temperature rises. Thus, in an excessively warm atmosphere, if the ambient air lacks movement and is laden with moisture, there may be not only impairment of heat dissipation by radiation, conduction and the evaporation of sweat, but the direction of heat flow may be reversed to the skin surface, increasing heat absorption by the body.

Clothing acts as an insulator, reducing the loss of heat through radiation and conduction by removing the temperature differential between the skin surface and the winter environment. In a similar manner it presents a barrier to a reversal in the direction of heat flow in extreme tropic heat. However, if the clothing be non-porous, the insulating effect may prevent the necessary evaporation of sweat from the body surface.

SODIUM CHLORIDE is an important component in the regulation of body temperature through sweating. Under normal conditions more than 95 per cent of salt is eliminated in the urine[4]; even that portion of the electrolyte that is secreted into the gastro-intestinal tract is not excreted, but is reabsorbed into the circulation for elimination by the kidneys. A considerable quantity of salt may, however, be lost by the increased excretion of sweat in a warm environment.[5] The salt content of sweat that is not excessive is approximately the same as in blood plasma. There is less salt, however, in the sweat of those who have become acclimatized to environmental heat.[6] In the presence of excessive perspiration the concentration of salt in sweat decreases, along with a diminution of the amount excreted in the urine. However, the loss of chloride in the urine may be enhanced when there is excessive ingestion of water during summer heat.

HEAT REACTION STATES

Three major syndromes may result from prolonged excessive environmental heat. These are heat cramps, heat exhaustion and heat stroke. Heat cramps are caused by lowered serum salt levels due to severe loss of sodium chloride in excessive perspiration. In heat exhaustion, salt depletion may be a factor, but more important is the element of circulatory shock due to a disturbance in the vasomotor regulating mechanism. Heat stroke is produced when hyperpyrexia results from the cessation of sweating due to fatigue of the heat regulating center of the hypothalamus. The clinical picture of sun stroke may resemble heat exhaustion or heat stroke, depending upon the predominance of the effect of the solar radiations upon the vasomotor or the heat regulating centers.

In heat cramps there are painful contractions of the voluntary muscles of the abdomen or extremities.[7] The body temperature remains normal. It is commonly noted in low environmental humidity, particularly where the sodium chloride reserve is reduced by low salt diets or by the loss of body salts through diarrhea or diuresis.[8] Ordinarily, the addition of 5-15 Gm. of sodium chloride to the daily diet will prevent or cure this condition. There is no mortality.

While cramps may also be present in heat exhaustion because of the profuse sweating, the clinical picture of the latter condition is predominantly one of peripheral circulatory collapse, lowered blood pressure, clammy skin, nausea, vomiting, oliguria, giddiness, faintness, headache and anorexia.[9] There may be little variation in body temperature in either direction. Treatment is directed toward correction of the salt depletion and control of shock.[10, 11] The aged, the infirm, alcoholics and the obese are most vulnerable, and a considerable mortality is present, especially among the debilitated.[12]

Following several days of excessive environmental heat there may be a complete cessation of sweating.[13] Since sweating is the mechanism almost solely responsible for the dissipation of body heat when the external temperature exceeds the skin temperature,[14, 15] a sharply rising fever results. This is heat hyperpyrexia, or heat stroke. Central nervous system symptoms are striking, and coma, convulsions or delirium may attract attention to the preexisting dry skin and hyperpyrexia. Tachypnea, Kussmaul or Cheyne-Stokes respiration may exist. The onset is generally acute and the mortality rate very high,[16, 17] particularly in the aged and debilitated. About the third or fourth day of a severe heat wave there may be a sharp rise in the number of cases, particularly in the presence of high relative humidity and reduced air movement. Among the predisposing factors are physical exertion and the wearing of heavy or tight clothing which limits the evaporation of the surface sweat. It is believed that this condition results from fatigue of the heat regulating center of the hypothalamus, due to abnormal physiological activity in the process of heat dissipation through sweating.[13, 18, 19]

In the management of the aged and the debilitated during prolonged periods of unusual summer heat, several features should be considered.

1. Reduction of internal production of heat or the absorption of heat at the body surface by discouraging physical exertions, arranging rest periods, and avoiding outdoor midday exposure.
2. Facilitation of the ready evaporation of sweat by enforcing proper skin hygiene and the wearing of light airy clothing.
3. The regulation of the dietary to provide for high carbohydrate and low protein, with increased salt and fluids.
4. The furnishing of supplementary salt tablets and vitamins.
5. The maintaining of regular sweat rounds in institutions, to discover the first sign of impending heat stroke—the cessation of sweating.

When the absence of sweating is discovered, all clothing is removed and the skin surface is sponged. The room should be kept cool and adequate air motion maintained. The use of fans for this purpose will generally suffice, although an air-conditioned room is preferred. In the absence of the latter, or if fever appears, the patient should be placed in an oxygen tent where the air is cooled, humidity is controlled and air motion is maintained. In this environment conditions are suitable for the increased dissipation of heat through the physical factors of radiation, conduction and convection, and an increased oxygen supply is available for the hypermetabolic emergency. Finally, if sweating does not supervene, or if hyperpyrexia appears, the use of cold wet sheets or cold water sprays to the body surface is advised,[20] along with massage of the chilled skin areas.[10] The reappearance of sweating presages the lowering of the fever, but relapses may occur.[13] The persistence of fever after sweating has returned suggests an intercurrent complication. Susceptibility to repeated attacks of heat stroke follows recovery from the original episode.[8]

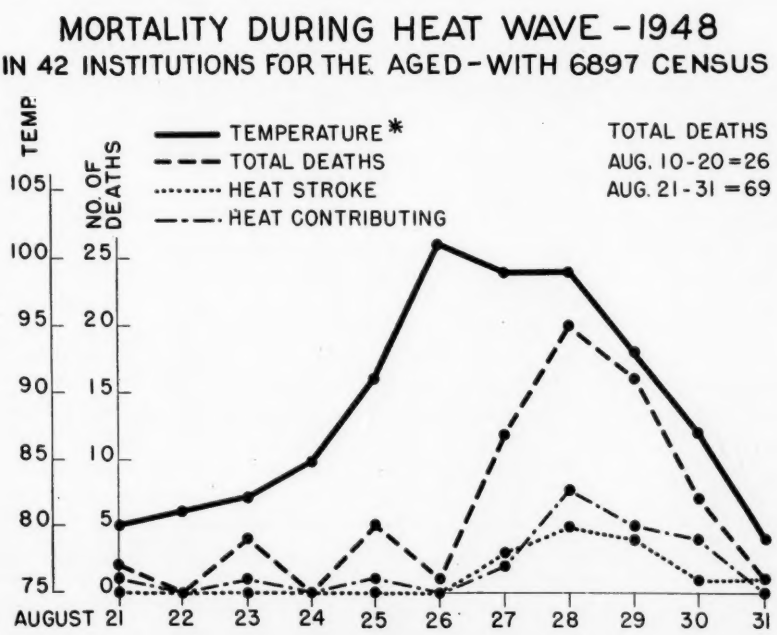
DURING the heat wave in New York City that began on August 23, 1948, the experiences of previous summers were repeated. The mortality rate rise

DEATHS DUE TO HEAT STROKE—AGE DISTRIBUTION
New York City, August 21-31

AGE	TOTAL	SEX	
		M	F
under one year	1		1
1-4	1		1
5-14	1	1	
15-24	0		
25-44	6	4	2
45-64	34	22	12
65 plus	13	5	8
	56	32	24

began on the fourth day, especially among the aged and those suffering from chronic diseases. While the general mortality rate for the city of New York rose to more than twice that of control periods, those suffering with cardiovascular and renal diseases, diabetes, pneumonia and carcinoma were particularly vulnerable to the added effects of the heat.[21]

In response to a questionnaire sent to 42 institutions caring for the aged, it was learned that 59 residents died between August 21 and August 31, which included the heat wave period. This compared with 26 deaths for the preceding eleven days. This mortality increase of 127 per cent included deaths due primarily to heat reaction as well as those where the effect of the heat contributed to the fatal outcome in another condition.



* *Maximum temperature at U. S. Weather Bureau sheltered station, about 400 feet above street level at Battery Park, New York City. This is substantially lower than exposed pavement temperature.*

SUMMARY

PROLONGED periods of high environmental temperature cause considerable morbidity and mortality in the aged. The importance of the evaporation of sweat in the mechanism for maintaining body temperature equilibrium is stressed. In the production of heat stroke, the cessation of sweating is the initiating disturbance. A regimen for the prophylaxis and treatment of

the condition is described, emphasizing hydrotherapy and the use of an oxygen tent.

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NEW STUDIES IN FORTHCOMING ISSUE

The papers from the 6th Annual American Geriatrics Society Meeting are now scheduled for future publication in GERIATRICS. Papers that the readers will not want to miss in the September-October issue of the magazine are: The Presidential Address by Dr. Hollis Clow, Endocrine Treatment of Alcoholism by Drs. Harold W. Lovell and John Tintera, and Hypertensive Heart Disease in Older Patients by Dr. Gabriel F. Greco.

Among other articles also scheduled for this issue are: Sickle Cell Anemia by Ferdinand Fetter, M.D. and Old Age by Trevor Howell, M.D.

A Brighter Future for Older People*

O. Spurgeon English, M.D.†

It is doubtless obvious to most people that the values by which we live are determined by the middle-aged. Those living at the extremes of life, i.e., the children and the older people, are more or less at the mercy of what the "middle-agers" wish and decide. Being young or old means that a variable degree of dependency and helplessness exists and those in middle life having the health and economic power to determine to a large degree the destiny of the young and the old.

In the western world, this has changed somewhat within the past 25-50 years. The needs of children are becoming better understood and there is a more widespread effort on the part of adults to meet these needs both in the home and in the school. We are still a long way from anything ideal in regards to rights and needs of children but the awareness that more needs to be done is there, and progress continues. And that same awareness that more needs to be done for older people is growing.

That improvement is under way is part of a psychological law which states that the more happy and secure are those in power, the more magnanimous and just they are going to be toward the helpless and dependent. This is an important aspect of what is being discussed in so many areas today as *emotional maturity.* It means that in the process of emotional growth there is enough received by the individual that as he reaches physical maturity he has a reserve of kindness and thoughtfulness for others which enables him to be a giver to those weaker and less fortunate, as well as to be able to compromise where differences of opinion exist.

Throughout the course of time we have had difficulty in avoiding one of two extremes in our attitude toward older people. It was either one of complete or near complete indifference and neglect which was often completely inhuman or tended toward a sentimental overvaluation which encouraged the older person to tyranny, meddling, and an exploitation of many younger lives which was unwarranted and most unfortunate. The middle ground determined by kindness and justice is the more mature and far safer in the end. No older person has the right to look forward to a time when he will usurp power and dominate the younger by reason of age or grey hair. If his life has been lived properly in terms of the appropriate emotional satisfactions at each age period, he will not look forward to exploiting age factors, but will try to adapt himself as well as possible to whatever lot fate brings

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his way. Older people need the greatest adjustability of all and get the least preparation for it. We are as yet not doing very much about teaching adolescents and young adults to make the most of their immediate lives when they have, as the late Ben Bernie used to put it, "the mostest of the bestest." More done early in life will be good training for the time when we may have the "leastest" of everything. Courses on self-improvement are few. Courses on preparation for marriage in a few high schools and colleges are one of the few examples of this necessary type of education.

DR. MAXWELL GITTELSON[1] has recently stressed some of the keynotes for the mental hygiene of old age. They are, (1) never to know that one is through, (2) never to feel superfluous, (3) never to lack significance, (4) never to be without use, (5) never to be without an outlet for the creative urge, (6) never to be without a word in the affairs of men. If these relationships with life could be achieved, how desirable for the older person!

To achieve them we would need much more thinking and planning from two directions. (1) Social, in which social and political planners made more opportunities for usefulness; and, (2) personal, in which each individual is helped and helps himself to live a more planful and effective life. As for opportunities for older men, an interesting excerpt comes from a recent magazine[2]: "Young Fellers are supposed to have more git-up-&-go than old fellers, and business organizations are supposed to slough off the old ones when they can, but we know a contractor who makes a specialty of trying to hire what he calls 'old men,' which, according to him, are men past 50. He says they get more work done. His best bricklayer is 60, his second best is 72. His best truck driver is 53." "The young men," he says, "are most interested in pay day, and least interested in fine workmanship. They come and they go. They make more turnover and more absenteeism. The men who are really carrying me and my business are the old boys." The contractor who vouches for this is 36 years old. His business is worth about a million dollars. He is a workingman himself, brought up as an electrician. He still has dirt under his finger nails. And he was always a union man. He says unions used to teach men how to do good work.

Here is real appreciation of the kind of work older people can do and especially is appreciation given to a good attitude, the latter being a matter which is held more and more in high regard by employers. The war made it clear how useful older people could be when needed. The above excerpt shows how easy it might be for them to compete in peace time with younger workers and what they could do if there were jobs for everybody.

SO MANY times the older person is penalized, not because he or she is physically incapable or health is bad, but because of a character difficulty. The female teacher or office worker gradually, even in the thirties, begins to lose buoyancy, breadth, a sense of humor, optimism, a friendliness for other people. She becomes sensitive, critical, domineering, possessive, and pedantic. She becomes unpleasant to work with; she stirs up the resentment of others.

Of the male also we hear it said, "He can't take directions; he acts so upset when new plans are introduced; he is no good at teaching the younger man." Of either sex we may hear it said, "he is so meddlesome, curious and gossipy, that we don't like him around."

CHARACTER traits which are annoying to others generally tend to become more marked with age. There are many reasons for this; we will mention two. The first is due to the fact that on the whole there is no widespread philosophy of continuous self-improvement. From kindergarten to twenty-one or thereabouts, is regarded as the age period for accumulating knowledge. From there on one goes through life using that store of knowledge and few people think that this store house of knowledge should be added to, so they go along. This was expressed by one wife as follows: "American men don't read books. Once they have passed their examination, they are busy putting that knowledge to use in being successful and making money, and they regard reading as effete or a waste of time." The second reason why our undesirable character traits become more evident as time goes on is that instead of yielding to environmental pressure and growing with the times, individuals feel that just the passage of time and perhaps a few grey hairs in itself gives them the right to assert their individual opinions upon others. We hear the statement, "I've been around here for 15 years, and I ought to know what's what" or, as one woman tried to clinch her argument with the statement; "as you see, I have a great many grey hairs and so I know what is right better than you." Such thoughtless presumption is irritating to younger people. Most all human beings, in early life, have smarted to some degree under the thoughtless authority of their parents. Hence, when they come to occupy positions in authority, they may take a great pleasure in turning the tables and penalizing the older person who has not retained kindness and flexibility.

SO WE see that the future of the older person lies, to a large extent, in his own hands. He must develop himself so that he remains useful through his physical efforts, or his personality qualities, or both, to the people of all ages around him. Then he will surely retain a word in the affairs of men. He will never be through, never feel superfluous, or never be without an outlet for the creative urge if he can do a job and make himself adaptable.

Now it must be clear that in discussing the older person and his problems we are not discussing anyone but ourselves. We are the older people of tomorrow. The preparation for old age or even for some of the perplexing problems of middle age begins early and continues through life. Just how early is indicated by observations which are being made on the upbringing of children. Observation on the Chinese encountered in China[3] indicated that they were very mature; that they possessed a sense of well-being associated with an "indestructible cheerfulness." The author believed that this was due to the fact that they had been well mothered, that the relationship

between parents and infants had been very supportive instead of interfering, and neglectful as we see so often in the Occident. If it be true that mankind knows a way to produce optimism and indestructible cheerfulness, then we should get about it without delay for every age period needs it badly and old age most of all. No amount of organized planning for the welfare of older people should preclude an individual personal responsibility on the part of everyone for the later years of life. It has been questioned whether we should plan as much as we do for children and adolescents lest we be overprotective and discourage resourcefulness on their part. However, they need help to acquire the characteristics of well rounded adulthood. But once adulthood has been reached the individual should not leave his adaptation to old age in the hands of fate and the planning of others. There is a great deal he should do about it as insurance against emotional poverty, loneliness, and disillusionment.

First comes early childhood when the child is eager to participate in many things. Time hangs heavily on his hands at times and the resourceful parent or teacher can show him many things which tend to satisfy his creative urge. Drawing, painting, wood work, sewing, tending flowers, cooking, mending, music; all these and many others are too often neglected in the growth of children. Generally, if they are doing the minimum amount of work to pass the school requirements, the parents are satisfied. As the child grows older an interest in nature, sports, and travel beyond the confines of one's own street should be encouraged. One woman of sixty-five wept pathetically as she said, "I could never get my husband to go anywhere. In thirty-five years of living with him, and he made a good salary, I saw Niagara Falls and Washington, D. C. Niagara Falls doesn't count, as it was our honeymoon. You might say that in thirty-five years, I only got him ninety miles away from Philadelphia. He was satisfied with seeing and doing so little."

People who are satisfied with seeing and doing little are limited people emotionally and when the time for retirement comes they are not always content to live quietly and unobtrusively. Moreover, the man or woman who has seemingly demanded little from life is not so content with little as would appear. We see this shown in the woman at the menopause who has led the limited, loveless, self-sacrificing life. When the menopause makes her forcibly aware that she is no longer young and that certain potentialities which life held are now unlikely to come to fruition, she becomes irritable, truculent, troublesome, sadistic, hostile, demanding, and a great problem to herself and others. The same thing can happen to older people who have led the quiet, unrewarding life. As they grow older the repressed unconscious demands for love, prestige, gratification, make themselves felt stronger than ever and the relatives are at a loss to cope with the change which has taken place.

Following our outline of preparation for old age, adolescence should be a time of more satisfying personal relationship. Our society now taboos to a

great extent, the social activities of the adolescent out of a fear that parties and late hours will be bad for the health, or that the danger of love-making will cause some personal or social disaster. Then fears often cause an anxiety and a limitation in socialization which makes individuals who shun others, who "don't like crowds," who "don't like people," who "would rather be alone," or who find no anticipation in social movement which brings them in contact with others.

Then comes the age of marriage with too many people making an unhappy choice and living a dull and cheerless married life if not one actually harmful to each other. Memories of an uncongenial married life are poor material for later life reflections.

Work should be congenial to both sexes. We know many women find home-making and child-rearing a pleasureless task as some find office or factory work the same. Too many men go drearily to work and long for the day when their work will be over. But, the man or woman who has hated his work will, in all likelihood if and when he retires, go to something even less cheerful and satisfying than what he left.

Retirement is generally a sad illusion. Few people realize how fortunate they are to be busy, to be occupied, to be contributing, to be in a position of some importance. When busy they feel imposed upon and complain but when they no longer have obligations they complain even more bitterly. To be no longer of importance is a most unfortunate experience.

We need so much education in how to live at all age periods. At present there is so much wasted energy, so much needless worry, so much striving for unimportant goals, so many values which change rapidly with circumstance. We need constant efforts to define the essentials in our relations with each other so that after the few essentials have been mastered there remains leeway for flexibility and the best type of cooperation. Quoting Dr. Gittleson again, he says, "The flexible person is one who respects himself but has no conceit, who has been guided by principles but who has not been the slave of dogma, who has had steadiness of purpose without being hypnotized by an immutable goal, who has bent his energies to making the grade rather than getting to the top first, who has tolerated his weakness while employing his strengths, who has respected his neighbor, as well as had pride in himself."

If these relationships with life could be achieved, how desirable for the older person! Some of these goals also are not reached even by people in the prime of life but they should be aimed for by everyone. If we add to this "a lively and kindly curiosity about people and diversity of interests," we have well formulated a condensation of the necessities for good adjustment in life. We must constantly discuss and define how this is to be done daily and if we can achieve such an adjustment we need have no fears regarding old age if we have reasonably good health and economic security. Economic security for old age is essential for the welfare and peace-of-mind of older

people. This, of course, puts a greater tax burden upon those who carry the responsibilities. But, we must be consistent and if we do not provide work for the older person, we should see that he has the necessary income without working. It has been said by many that plans for economic security in old age were deterrents to ambition and industry. This is questionable reasoning for productivity and cooperation, and not well sustained by fear of privation. There is good evidence that people can be taught productivity and usefulness without fear of destitution while the fear of an unprotected old age is one of the sources of illnesses which incapacitate many people in our society resulting in great economic loss in working hours and money spent for medical care. Finally, with what we assume to be an increasing social consciousness, there would be an increasing feeling of guilt on the part of those who are healthy and productive if they did not help to provide for a better way of life for older people.

A PRACTICAL application of the personality of some men who still insist upon being of some use is shown by the Forty Plus association of Philadelphia. This club, of which Philadelphia's organization is one chapter, was born during the depression. The Philadelphia group started in 1938, composed of men over 40 having ability but without a job. The club exists to find jobs for its members and to combat the prejudice of business and industry to the man employee over forty years of age. They emphasize the importance of experience and point out the value of experience in training younger men for responsibility. The membership is composed of men who have been successful but have been dislodged from positions through reorganizations, retrenchments and other unexpected conditions. They comprise, therefore, a special group of the whole aging problem, but they do indicate how soon aging is regarded as a handicap and they show individual efforts combining to improve their lot and help minimize popular prejudice. They believe they have something to contribute but they are willing to improve to come up to expectations. They show a constructive, aggressive approach to the handicap of aging by improving and selling themselves instead of retiring in defeat.

We cannot justifiably discuss the emotional problems connected with older people and not touch upon the matter of living with relatives. Such an arrangement produces frictions in so many cases these days that it seems desirable to recommend separate living arrangements for many of the older people, even though the housing shortage makes this, in so many cases, impossible at present. When we get caught up in housing, then it seems a better arrangement to have older people living together in a housing project or a home for older people, having an adjoining apartment if the older people need some supervision; a separate apartment in the house if the house is large enough to warrant this or a separate home completely removed from relatives in other instances where there is physical and financial independence. Is this on rational or selfish grounds? Rational we think, because

first, the interests of at least the four divisions of people, i.e., children, adolescents, adults, and older people are sufficiently diverse to have them need the benefit of each other's company part of the time. Certain interests cannot be constantly shared by these different age groups. Second, few human beings have yet learned to respect the rights of another to some privacy and privilege of doing things his own way. Here, very often older people are the culprits since they feel their added years entitle them to give too much advice, to try to run things, and to try to usurp attention.

To SUGGEST that older people live by themselves or with others their own age may seem at first glance inconsistent with the suggestion that older and younger people work together and be of help to each other. To work together and to be mutually helpful does not mean always living under the same roof and being thrown constantly together. Many people give their best and function well together and make creative contributions to life when they meet for awhile and then part for an hour, a day, or a week. Thrown together regardless of age, friction and tension develops, and mutual appreciation and creativity disappear. In the distant future when we know more of human nature and have cultivated more understanding and patience, we may all dwell in peace. But, for the finish of the present century at least it seems that we had better stop insisting that all ages live closely together willy-nilly and like it. Human personality must reach a higher plane of love and understanding before many people born 20 or more years apart can live together in harmony. Moreover, we feel that it is not necessary to be disturbed by our present failure in this aspect of human relations but, remember that we are improving and will one day come to more communion and less isolation in the relations between different age groups.

Children and adolescents *must* of necessity live with and accept in large degree the regulations of the parents but few of the middle and old age groups seem to want to accept the domination of each other and until we advance in cooperation, separate living arrangements seems the best answer.

CERTAIN degrees of ill health are certain to complicate the lives of a certain number of older people. Medicine is taking a greater interest in the illnesses of this age period. Socially we are moving toward greater economic security. Recreational and work programs are bringing the much-needed sense of usefulness and being related to others. Every effort made by society toward making the life of the child happier and more meaningful, and in doing the same for the older people is a step toward the improvement of society as a whole. A brighter future for old age depends upon continuing our efforts towards improving the physical state and enhancing the emotional and spiritual values of later life, as our agencies are trying to do but looking even beyond this to enriching human life prior to old age. This puts a responsibility upon every one of us beginning right now to prepare ourselves for a later life in which our contribution in optimism, usefulness, acceptance of

changes and quiet wisdom aside will make a place for us beside them and say, "We need those with experience in knowing how to work and live. Let us work and learn together." This will truly be a brighter future for all ages. When we have all cooperated to bring out the inherent values in older people, we will all be better citizens of a stronger nation.

Vitamin A in Middle-Aged and Old Individuals

*Esben Kirk and Magaret Chieffi**

INFORMATION on the clinical aspects of vitamin A is extensive but data on the plasma concentration of the vitamin and of carotenes in middle-aged and old individuals are scanty.

Esben Kirk and Margaret Chieffi, Washington University School of Medicine, determined the plasma concentrations of total carotenes, alpha and beta carotenes and vitamin A in 155 individuals between the ages of 40 and 99 and 47 younger individuals between 16 and 39 years.

The diet offered the older age group was calculated to contain between 2,000 and 4,000 micrograms of vitamin A and carotene daily. This vitamin A content was considered adequate for adults.

The diet of the younger individuals was not evaluated.

None of the subjects received supplementary vitamin preparations prior to the blood analysis.

The carotene and vitamin A values showed great variation in the different individuals. No certain difference was found between the male and female subjects.

The average concentrations of plasma total carotenes and alpha plus beta carotenes were somewhat higher in the younger group than in the middle-aged and older groups. However, the difference was not statistically significant. The vitamin A level for the various age groups, also, did not vary significantly.

The average concentrations for vitamin A, total carotenes, and alpha plus beta carotenes in the plasma were 17-23, 200-320, and 100-190 micrograms per cent respectively.

*Vitamin Studies in Middle-Aged and Old Individuals I. The Vitamin A, Total Carotene and Alpha + Beta Carotene Concentrations in Plasma. Journal of Nutr. 36: 315-322, Aug. 1948.

The Age-Factor in the Brain Lesions Produced by Desoxycorticosterone Overdosage

Paolo S. Timiras, M.D.,† *Claude Faribault,* M.D.,† *and Hans Selye,* M.D.†

PREVIOUS experiments have shown that, in a variety of animal species, prolonged overdosage with the synthetic corticoid compound, desoxycorticosterone acetate (DCA), causes—in addition to nephrosclerosis, hypertension, periarteritis nodosa and arthritis[1-6]—severe morphologic changes in the brain.[7-10] These cerebral lesions are characterized macroscopically by hemorrhages and edema, microscopically by marked hyalinization and necrosis of the brain vessels. They may be associated with deposition of hyalin ("fibrinoid") material in other organs such as hyalin degeneration of arterioles and renal glomeruli, hyalin plaques surrounded by granulomatous nodules in the heart, deposition of fibrinoid material on the cardiac valves and the pericardium, etc. They appear to be part of the general pattern of the fibrinoid diathesis or hyalinosis.[11-12]

In this study, we wish to report upon an additional series of observations on the action of desoxycorticosterone in young and adult rats some of which have been subjected to a special surgical procedure. It was the object of this investigation to clarify the influence of the age-factor upon the action of DCA on the nervous system and to correlate the experimental disease with its counterparts in human pathology.

MATERIALS AND METHODS

Fifty-six hooded male rats were castrated, unilaterally nephrectomized and separated into six groups (see Table I). The first four groups consisted of adult rats with an average weight of 210 gm. Group I received five 15 mg. pellets of DCA subcutaneously and, at the same time, their calvarium was removed to allow volume changes of the brain to take place freely. Thus, the surface of the cerebral hemispheres, in these calvariumectomized rats, was covered only by the meninges and the scalp. The animals of group II were not calvariumectomized but implanted with the same amount of DCA as those of group I. The rats of group III were calvariumectomized but did not receive DCA. The animals of group IV acted as untreated controls.

The last two groups consisted of young rats with an average weight of 80 gm. and were not calvariumectomized. In group V the rats were implanted with the same amount of DCA as those of groups I and II, while the animals of group VI acted as untreated controls for group V.

All animals were given purina fox chow and 1 per cent NaCl in tap water as a drinking fluid, ad lib. The animals were castrated, unilaterally

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TABLE I

THE INFLUENCE OF THE AGE-FACTOR UPON THE BRAIN LESIONS PRODUCED BY PROLONGED OVERDOSAGE WITH DESOXYCORTICOSTERONE ACETATE

(Averages and standard errors)

Group	No. of animals	TREATMENT	Body Weight		SURVIVAL TIME	KIDNEY			HEART			BRAIN		Adrenals	Hypophysis	Pancreas (periarteritis nodosa)	Mesenteric Vessels (periarteritis nodosa)
			Initial	Final	(days)	mg.	mg/100 cm² B.S.	Nephrosclerosis %	mg.	mg/100 cm² B.S.	Myocarditis %	mg.	mg/100 cm² B.S.			%	%
I	8	Desoxycorticosterone acetate, calvarium removed	215.5 ±7	160.5 ±20	63 (50 - 72)	2179 ±120	797 ±86	87.5	999 ±38	366 ±26	87.5	2522 ±197	942 ±63	44 ±2.5	9.5 ±0.5	87.5	87.5
II	8	Desoxycorticosterone acetate	208 ±7	160 ±20	41 (30 - 55)	1929 ±84	732 ±66	75	917 ±35	352 ±21	58	1822 ±162	686 ±92	44 ±1.5	10.5 ±1	62.5	62.5
III	8	calvarium removed	209 ±7	270 ±21	killed as controls to group I	1807 ±54	473 ±30	0	990 ±67	260 ±16	0	1813 ±35	483 ±35	43 ±1.5	11.5 ±1.5	0	0
IV	8	controls.	208 ±8	283 ±20	killed as controls to groups I, II	1797 ±65	456 ±49	0	1064 ±95	270 ±43	0	1843 ±26	489 ±25	45 ±1.5	11 ±0.5	0	0
V	12	Desoxycorticosterone acetate	79 ±10	83.5 ±28	61 (44 - 71)	1169 ±80	725 ±69	88	734 ±44	449 ±47	85	2346 ±136	1300 ±67	28.5 ±2.2	5.5 ±0.6	83	83
VI	12	controls.	77 ±9	163 ±20	killed as controls to group V	932 ±47	344 ±29	0	516 ±59	206 ±31	0	1875 ±102	687 ±57	29 ±2	7.5 ±0.5	0	0

nephrectomized and given ample NaCl since we know[12-13] that such sensitization increases the pathogenic actions of DCA.

RESULTS

In the course of the experiment, all the DCA-treated rats developed the characteristic polyuria and hypertension. There was a marked decrease in the body-weight of all the adult and a severe inhibition of growth in all the young rats treated with DCA. At the beginning of the fourth week of treatment, all the DCA-implanted rats showed nervous manifestations. The animals belonging to group II presented clear-cut motor disturbances of variable intensity and duration. In mild cases, we saw clonic contractions of the digits of the front paws, especially manifest when the rats tried to walk. In the severe cases, the head and shoulders showed rapid contractions and the rats fell on their side or back. These epileptoid seizures were accompanied by hyperexcitability, hypersensitivity, restlessness and confusion. The animals usually died during the first or after two or three of these convulsive attacks. The rats belonging to groups I and V rarely showed convulsions.

In the young DCA-treated animals (group V), between the 50th and 72nd day, a marked skull deformity developed, with enlargement and rounding of the calvarium resembling the spontaneous hydrocephalus of the rat. Similarly, but to a lesser degree, the adult calvariumectomized rats showed a distention of the scalp. In both groups there were signs of increased intracranial pressure: papilledema, hemorrhages of the retina in two cases, semicomatose state, often interrupted by mild contractions of the front paws, weakness of the posterior paws, confusion and hypersensitivity. At the end of the eighth week of treatment, the moribund condition of the surviving animals made it necessary to terminate the experiment.

As can be seen in the fifth column of Table I there was an increase of the survival time of the DCA-treated rats belonging to groups I and V. This was most probably due to the fact that in them, the increase in intracranial pressure was less marked, because, in the calvariumectomized rats, removal of part of skull and, in the young rats, softness of the skull permitted greater distention.

GROSS FINDINGS

Both the absolute weight of the kidney and its weight per 100 cm.^{2} of body surface are listed. According to either method of expression, it was higher in groups I and V than in other groups of corresponding body weight, presumably due to their longer survival. In group II, the kidney weight was significantly different from the controls only in terms of body surface.

The degree of nephrosclerosis was expressed in a scale ranging from 0 to + + +. The average was obtained by adding all the pluses in a group and expressing this figure as a percentage of the possible maximum (i.e., + + + in all animals). It will be noted, that, when so expressed, the degree of nephrosclerosis was higher in the calvariumectomized and young rats than in the rats of group II, but this is of doubtful significance.

The heart weight is expressed in the same manner. There was no

significant increase in the absolute weight of the heart, except in group V. However, there is a statistically significant difference between the relative weight of all the DCA-treated animals and their respective controls. The heart weight appears to be a rather reliable indicator of the mean blood-pressure prevailing during the entire length of the experimental period. Indeed some investigators believe that this is a more accurate index of hypertension than the occasional direct measurement of blood-pressure at rare intervals throughout the experiment, because it is less likely to be influenced by sudden transient variations.

MYOCARDIAL changes, with the formation of giant-cell granulomas and hyalin deposits between the muscle cells, were most frequent and severe in the rats belonging to groups I and V, again presumably due to increased survival.

The brain weight was calculated as above. Expressed either way, the brain, in groups V and I, was significantly heavier (with a $P>0.01$), than in the controls or even in the DCA-treated adult rats. As we have already mentioned, the increase is greater in the young than in the calvarium-ectomized adult, DCA-treated animals.

At autopsy, the increase in brain weight was shown to be mainly due to a tremendous edema and accumulation of cerebrospinal fluid (fig. 1).

FIG. 1. *Brain lesions produced by a prolonged overdosage with DCA.* On the right side, the brain of an untreated adult control. On the left side, the brain of an adult rat treated during 65 days with high doses of DCA. Note the increase in volume of the cerebral hemispheres and the very marked degree of edema. Only few, petechial hemorrhages are observed.

The resulting increase in volume affected especially the two hemispheres; there was flattening of the gyri and a narrowing or even obliteration of the sulci as well as an enlargement of the central and subcortical white matter. The base of the brain was not noticeably enlarged. There were disseminated petechial (fig. 2)—occasionally massive—hemorrhages in various regions.

FIG. 2. *Brain lesions produced by a prolonged overdosage with DCA.* On the right side, the brain of an untreated control. On the left side, the brain of a young rat, treated during 65 days, with high doses of DCA. Note the increase in volume of both hemispheres, the flattening of the gyri and the narrowing of the sulci. Two large hemorrhages are observed.

The brain of the rats in group II did not show any increase of the hemisphere volume. There were only large hemorrhages and occasionally a very moderate degree of edema.

The adrenals, in the DCA-treated animals, did not show the compensatory atrophy which would be expected as a result of the usual inhibition of pituitary corticotrophin production by corticoids.[14] This must probably be ascribed to circulatory changes resulting from periarteritis nodosa of the adrenal vessels which, under these experimental conditions, are involved in the general process of hyalinization.

The weight of the pituitary was almost the same in both DCA-treated animals and untreated controls.

There was marked periarteritis nodosa in the pancreas and the mesenteric vessels greater in the young and in the calvariumectomized rats than in the adult rats belonging to group II.

Histologic examination of the kidney, heart, adrenals, pancreas and mesenteric vessels confirmed the macroscopic findings of nephrosclerosis, myocarditis and periarteritis nodosa.

In the brain, microscopic examination revealed two principal types of abnormalities in all DCA-treated animals: a) changes in the brain paren-

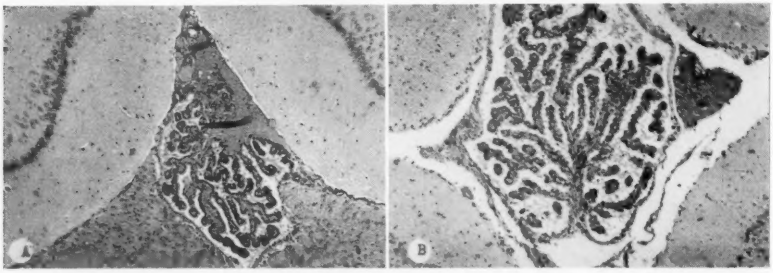

FIG. 3. *Hypertrophied chorioid plexi produced by a prolonged overdosage with DCA. A.* Untreated control. *B.* Rat treated with DCA during 65 days. Observe the hypertrophy of the chorioid cells and the increased amount of cerebrospinal fluid.

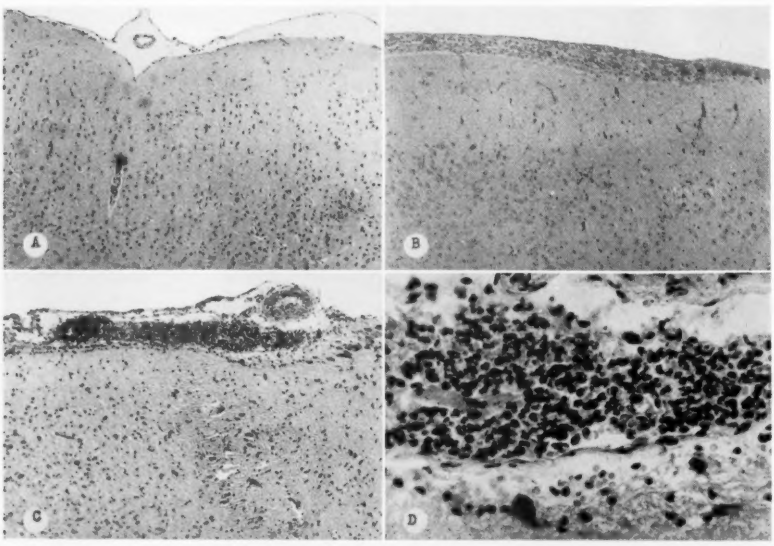

FIG. 4. *Meningeal lesions produced by prolonged overdosage with DCA. A.* Untreated adult control. *B.* Rat treated with DCA during 35 days; note the thickening and the infiltration of the meningeal wall by polynuclear cells. *C.* Young rat treated with DCA during 65 days. Note in addition to the meningeal infiltration, the inflammation of a cerebral vessel. *D.* High magnification of *C.* Note the infiltration of the meninges by numerous polymorphonuclear cells and some erythrocytes.

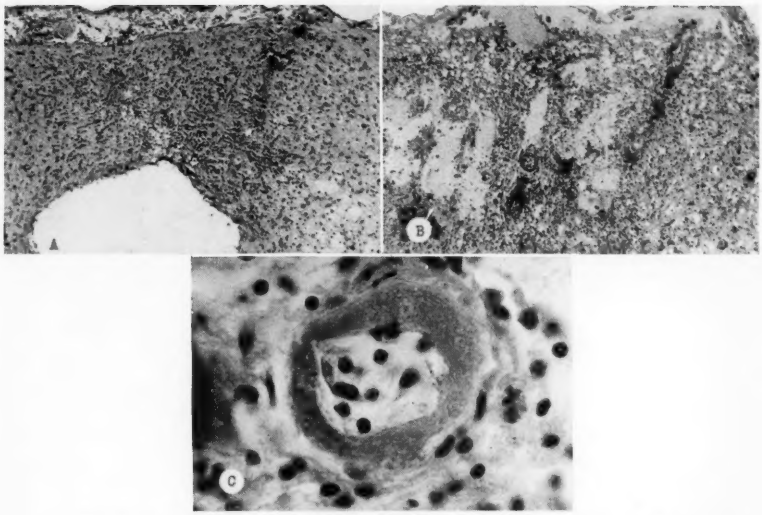

FIG. 5. *Hyalinosis of vessels and necrosis of the brain tissue produced by prolonged overdosage with DCA. A.* Cerebral cortex section of a rat treated with DCA during 50 days. Note the hyalinosis of the vessels, the infiltration of the brain tissue by polynuclear cells, the formation of necrotic areas with liquefaction and the thickening as well as the infiltration of the meninges. *B.* Same animal but other region of the brain. Note the liquefaction cyst. *C.* Hyalinosis of a brain vessel at high magnification. Note the complete homogenization of the vessel wall.

MICROSCOPIC FINDINGS

chyma and b) vascular lesions. There was a more or less generalized edema especially of the nervous parenchyma in the young and in the calvariumectomized animals. There was also distention of the perivascular spaces with extravasation of erythrocytes around the vessels. The cells of the chorioid plexus and of the ependyma were hypertrophied (fig. 3), the meninges thickened and, in two cases, infiltrated with polynuclear cells (fig. 4). The arterioles showed periarteritis nodosa lesions with a high degree of hyalinization and cellular infiltration of the vessel walls (fig. 5). Thromboses often caused extensive necroses (fig. 5). There was also a certain amount of venous stasis and congestion. Mitotic figures were frequently seen in large cells (fig. 6) whose identity could not be ascertained because of the dedifferentiation incident to cell-division. Glia-proliferation was manifest especially in the regions most severely damaged by the disturbance in circulation.

DISCUSSION

The brain changes, reported in the present investigation, are closely related to those previously noted in our DCA-treated animals. They are ascribed to vascular lesions caused by an excessive amount of corticoids. They are part of the general hyalinosis involving many organs. These changes are important

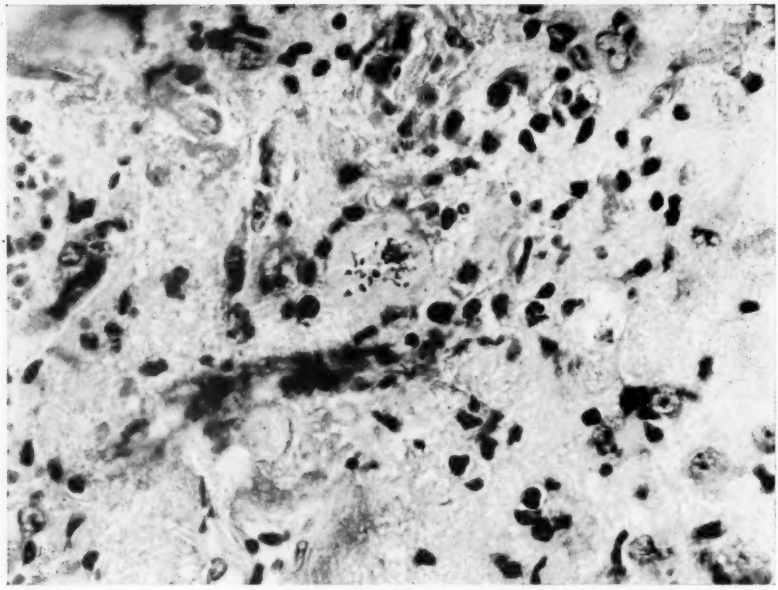

FIG. 6. *Mitosis in a cell such as is observed in the brains of rats chronically treated with DCA.* High magnification of a large cell in mitosis: adult rat treated during 50 days.

since they are often the cause of death. The observations reported here show especially that local factors (such as intracranial pressure) can influence the severity of their consequences. This also explains the relative DCA-resistance of young animals, whose soft skull is readily distended, so that a great increase in intracranial pressure is avoided.

A REVIEW of the literature, in the light of these results, reveals that similar brain lesions are found in some diseases of man whose possible relationship to each other and to the adrenal cortex has not been seriously considered up to now. Previous studies[15] suggested that various types of systemic stress (e.g., infections, intoxications, nervous stimuli, allergic reactions) can cause diseases due to excessive endogenous production of corticoid hormones. These were interpreted as "Diseases of Adaptation," since the secretion of corticoids under stress is an essentially useful defense reaction.

Involvement of the cerebral arteries in the general process of hyalinosis and necrosis of the vessel-walls has been recognized[16-34] ever since Kussmaul and Maier[16] described periarteritis nodosa. Cerebral alterations can even dominate the clinical picture (myelo-neuro-myopathic form of Marinesco[35] and meningeal form of Bennett and Levine[37]) and, therefore, have been especially studied.[35-41]

In recent years, attention has also been directed to the occurrence of vascular lesions in the brain of patients with disseminated scleroderma: in 70 per cent of these, abnormal electroencephalograms have been described and, in two cases, clear-cut proliferation and degeneration of the cerebral arteries were observed.[42-49]

Disseminated lupus erythematosus is regarded today (Klemperer, Pollack and Baehr[54]) as a systemic disease with widespread involvement of the collagenous tissue, especially of the vascular system. It is generally recognized that this disease affects the central nervous system, although only a few references to such cerebral involvement can be found in the literature. All of these show a striking similarity with the lesions described in the present investigation. The nervous lesions of lupus erythematosus are characterized clinically by delirium, psychosis, convulsions, headache and visual disturbances.[56] The pathologic picture is one of a non-specific encephalitis accompanied, in some cases, by non-specific meningitis.[50] This encephalopathy seems to be primarily due to a marked hyalinization of the vessels, while the lesions of the nervous parenchyma are secondary to vascular alteration.[50-57]

Although the frequency with which severe, widespread arteritis takes place in the brain of persons with rheumatic cardiovascular disease is not well known, its occurrence is by no means rare. The softening of multiple, sometimes large areas of grey and white matter, the proliferation and infiltration of the walls of meningeal and cortical arterioles show some close relationship with the cerebral lesions produced by DCA.[58-66]

In malignant hypertension, similar brain lesions have been often described.[67-80] The changes which are regarded as typical of this condition consist ". . . of hyaline degeneration and fibrotic thickening of the vessel wall with narrowing or complete obliteration of the vascular lumina . . . these vascular changes, confined to arterioles and capillaries, are different from those found in arteriosclerosis and are to be interpreted as a special form of hypertensive arteriopathy. The alterations of the nervous parenchyma, characterized by diffusely scattered small foci of old and recent softening, were interpreted as secondary to the vascular lesions . . . (Scheinker[79])."

The brain lesions described in periarteritis nodosa, scleroderma, lupus erythematosus, rheumatic diseases and malignant hypertension, appear to be closely interrelated. As already stated, they are probably all secondary to hyalinization of blood vessels. We felt that their morphologic similarity to the cerebral lesions of experimental hypercorticoidism deserves to be emphasized.

SUMMARY

Young and adult rats have been treated with high doses of desoxycorticosterone acetate (DCA). In some of the adult animals the calvarium was removed to prevent any great increase in intracranial pressure.

In addition to hypertension, nephrosclerosis, myocarditis and periarteritis nodosa of the mesenteric and pancreatic vessels, all the DCA-treated rats showed severe brain lesions. The latter were characterized

by clear-cut motor disturbances, hypersensitivity as well as marked enlargement and rounding of the skull.

The gross findings consisted in pronounced edema of the brain with an increase in the volume of both hemispheres, narrowing and even obliteration of the sulci, flattening of the gyri as well as petechial and occasionally massive hemorrhages.

Histologic examination revealed two types of abnormalities in the brain of the DCA-treated animals: a) periarteritis nodosa of the arterioles with pronounced hyalinization and cellular infiltration of the vessel walls, venous stasis, congestion, and multiple small thromboses, b) degenerative changes and necroses in the nervous tissue. The latter were probably secondary to vascular lesions.

Attention is called to the possible relationship of these experimental lesions with the cerebral manifestations of: periarteritis nodosa, scleroderma, lupus erythematosus, rheumatic diseases, and malignant hypertension.

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Effect of Choline on the Prevention of Experimental Atherosclerosis*

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THE FOLLOWING investigation by the authors is reported to review the results obtained in atherosclerosis experimentally produced in rabbits by the feeding of cholesterol and the attempt made to prevent this cholesterol induced atherosclerosis in rabbits by the simultaneous feeding with choline.

The experimental production of atherosclerosis in rabbits and chicks has been studied as a means of investigating the pathogenesis of arteriosclerosis.[1-8] During the course of such studies, Steiner first reported that choline chloride mitigated the atherosclerosis produced in rabbits by cholesterol feeding.[7,8] This author found that 500 mg. and 750 mg. daily doses of choline chloride offered some protection against the development of atherosclerosis.

A subsequent investigation by Broun, Andrews and Corcoran reported the effects of various lipotropic agents used in the experimental production of cholesterol atherosclerosis in the rabbit.[10] These authors employed different lots of lipocaic, prepared by themselves and by the Eli Lilly Company, in addition to betaine, methionine, inositol and choline chloride. In a large series of rabbits various dosages and combinations of the above lipotropic agents were employed. Broun, Andrews and Corcoran found that the most effective lipotropic agent in experimental atherosclerosis was choline chloride. 500 mg. of choline chloride was fed to one series of rabbits who were also given 0.5 gm. of cholesterol daily over a period of 14 weeks. The lowest grade of atherosclerotic involvement occurred in this group, as compared to 20 other groups of rabbits given various doses of lipocaic, betaine, methionine, inositol, and choline in doses of 10 mg. to 75 mg. Smaller doses of 10 to 40 mg. of choline also gave some protection in three-month-old rabbits, but failed to protect animals six to eight months old. Steiner also failed to find protective action by betaine hydrochloride, methionine and inositol. Keston and Silbowitz also reported that the administration of choline mitigated the development of cholesterol atheromatosis in rabbits.[9]

The above report by Broun, Andrews and Corcoran summarized the results of an eleven-year investigation on the efficacy of various lipotropic agents in cholesterol atherosclerosis in rabbits.

The author studied the lipotropic action of choline chloride and choline carbonate in a series of 61 rabbits. These animals were fed 0.5 gm. of cholesterol, daily with a basic diet of Purina rabbit chow. In addition, 1 gm. of choline chloride

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was fed to each animal simultaneously with the cholesterol, over a three-month period of time. The rabbits were males, three months old at the time the experimental feedings were begun, were litter mates and were fed the experimental substances intimately mixed with the chow as prepared especially for this study by the Golden State Milling Co. of Downey, California. Each animal was fed individually and assured of a daily complete food and experimental substance intake. The experimental material was taken without difficulty, all animals showing gains in weight and normal activity.

At autopsy, the grade of atherosclerosis of the aorta was described as 0 whenever no involvement of the aorta by atherosclerosis was grossly visualized or palpated by the examining fingers. Grade 1 was employed to describe a slight degree of atherosclerotic involvement of the intima of the aorta; Grade 2 described moderate atherosclerosis of the aorta; Grade 3 indicated marked atherosclerosis; Grade 4 indicated complete atheromatosis of the surface of the aorta.

The rabbits were divided into three groups. Group A consisted of 20 controls who were fed 0.5 gm. of cholesterol daily without any choline for 92 days. Group B consisted of 29 rabbits fed 0.5 gm. of cholesterol together with 0.5 gm. of choline chloride daily for 92 days. Group C consisted of 32 rabbits fed 0.5 gm. of cholesterol together with 1.0 gm. choline chloride daily for 92 days.

Autopsies were performed on all animals in each group on the 93rd day after the feeding experiments were begun. Table I describes Group A, the control group, which was fed 0.5 gm. cholesterol daily; all animals but one developed atherosclerosis in 92 days. Table II describes Group B in which the animals were fed 0.5 gm. cholesterol daily together with 0.5 gm. choline chloride; these developed atherosclerosis in 45% of cases while 55% of the animals were free of atherosclerosis in 92 days. Table III describes Group C in which the animals were fed 0.5 gm. cholesterol daily together with 1.0 gm. choline chloride; these developed atherosclerosis in 22% of cases in 92 days; 78% of the animals were free of atherosclerosis.

TABLE I

ATHEROSCLEROTIC INVOLVEMENT OF THE AORTA IN RABBITS FED 0.5 GRAMS CHOLESTEROL DAILY FOR 92 DAYS

Grade of Involvement	0	1	2	3	4	Total
Number of rabbits	1	2	2	7	8	20
% of rabbits affected	5%	10%	10%	35%	40%	100%

TABLE II

ATHEROSCLEROTIC INVOLVEMENT OF THE AORTA IN RABBITS FED 0.5 GRAMS CHOLESTEROL AND 0.5 GRAMS CHOLINE CHLORIDE DAILY FOR 92 DAYS

Grade of Involvement	0	1	2	3	4	Total
Number of rabbits	16	6	7	0	0	29
% of rabbits affected	55%	21%	24%	0	0	100%

TABLE III

ATHEROSCLEROTIC INVOLVEMENT OF THE AORTA IN RABBITS FED 0.5 GRAMS CHOLESTEROL AND 1.0 GRAMS CHOLINE CHLORIDE DAILY FOR 92 DAYS

Grade of Involvement	0	1	2	3	4	Total
Number of rabbits	25	5	2	0	0	32
% of rabbits affected	78%	16%	6%	0	0	100%

SUMMARY AND CONCLUSION

1. The oral feeding of 0.5 mg. choline chloride daily together with 0.5 gm. cholesterol to 29 three-month-old rabbits prevented atherosclerosis in 55% of the animals at the expiration of the 92-day experimental period.
2. The oral feeding of 1.0 gm. choline chloride daily together with 0.5 gm. cholesterol to 32 three-month-old rabbits prevented atherosclerosis in 78% at the expiration of the 92-day experimental period.

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Gall Bladder Torsion

Francis Xavier Haines, M.D., and John Timothy Kane, M.D.*

Acute torsion of the gall bladder occurs predominantly in elderly people and particularly where visceroptosis is present.

According to Francis X. Haines, M.D., and John T. Kane, M.D., Binghamton, N. Y., torsion occurs by one of four anatomic arrangements of the viscus, 1) gall bladder embedded in liver tissue, 2) gall bladder closely attached to under surface of liver with intervening connective tissue, 3) outer surface of fundus surrounded by peritoneum and the rest attached to the liver but not actually touching, 4) gall bladder completely surrounded by peritoneum and free except for attachment at cystic duct.

Onset is acute with sudden severe pain in upper abdomen. Radiation of the pain to back or shoulder is not infrequent. Vomiting is frequent but not constant. An exquisitely tender mass in the gall bladder region is palpable within 2 hours after onset. Muscle spasm and rigidity are present. Chills and fever are characteristically lacking during first 24 to 48 hours.

Acute torsion of the gall bladder is most often confused with cholecystitis or cholelithiasis, hydrops or empyema of the gall bladder. Other conditions which must be differentiated are appendicitis, intestinal obstruction, twisted ovarian cyst, and ruptured peptic ulcer.

Early surgery is the treatment of choice.

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*Acute Torsion of the Gall Bladder. Ann. Surg. 128: 253-256, Aug., 1948.

Cancer as a Phenomenon of Rejuvenescence

Joseph L DeCourcy, M.D.*

THE DEGENERATIVE changes observed in senescence, or "physiologic aging," are widely though not universally regarded as "normal" results of a retrogressive process, a necessary involution as "natural" as growth. These changes are considered *normal* because, sooner or later, all organisms except perhaps certain unicellular forms grow old, the maximum life span depending upon the species. This conception involves the assumption that the basic processes of life themselves necessarily are accompanied by involutionary processes. The very structure and fundamental physiology of the organism are such as to necessitate eventually lethal senescence.

Once it was maintained that every cell, tissue or organ as well as the organism as a whole must age. Now we know that individual cells and excised portions of tissue, even of human beings, may be cultured, kept alive indefinitely, and therefore are potentially immortal. Careful histological studies, moreover, have shown that corresponding tissues in different individuals frequently age at different rates. Apparently youthful tissues are to be found in every aged individual, no matter how old. Thus, there is convincing evidence that, whatever senescence may be, it is not a *necessary* phenomenon at least insofar as individual cells or isolated tissues are concerned. Steadily improving techniques of organ culture indicate that whole organs and possibly even entire organ systems may be potentially ageless. If senescence is necessary (under certain conditions), it is a special, unique phenomenon of the organism as a whole.

CONSIDERATION of certain aspects of cancer is suggestive in this connection. The theory of embryonic rests is based upon the assumption that isolated masses of human cells of various types are practically ageless and therefore are capable of embryonically youthful growth even in the oldest individual. Further, it appears that any tissue—no matter how old or actually "aged"—may become cancerous, capable of manifesting the growth momentum characteristic of the most youthful tissue. In fact, a number of authors have reached the conclusion that cancer must be included among the aging processes, as one of the necessary end results of senescence. Statistical studies appear to demonstrate that if any mammal or even any mammalian tissue lives long enough it must eventually become cancerous. The older the tissue, the greater would seem to be the probability of its undergoing cancerous degeneration.

Insofar as growth momentum is concerned, it must then be assumed:

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The older a tissue, the more youthful it becomes! The term *senescence* and the conception of "physiologic aging" are thus seen to be, in an ultimate analysis, not merely confusing but apparently indefinable. Carrel attempted to measure biologic (as distinguished from chronologic age) by measuring rate of proliferation of cells. Obviously, by such a "yardstick" the tissue which undergoes "normal" senescence, with characteristic degeneration, and finally becomes cancerous must be considered to manifest a rejuvenescence.

INDEED, one might well ask: Just what degenerative changes are not pathological but "natural concomitants" of normal senescence? No author has as yet been able to distinguish clearly between degenerative diseases of advanced life and the processes which are widely believed to be inevitable or natural concomitants of life that endures long. Numerous investigators are confidently at work on the problem of the etiology of arteriosclerosis—with a view toward eventual prevention or satisfactory treatment of the degenerative disease. Cardiologists search for the cause and means of prevention of degenerative changes in cardiac muscle—changes which were once regarded as necessary because commonly associated with advanced human life. Students of cancer consider this degenerative disease at once as a manifestation of aging and as an eventually curable if not preventable malady. In short, as we review the work in progress in the various specialties in the field of geriatrics we note that each and every specialist now appears to base his research on the assumption: For every degenerative change there is a cause, and where there is a cause, a means of prevention or counteraction can be logically sought. Today the gerontologist is an eminently optimistic researcher. It is impossible to mention any manifestation of so-called senescence that is not under study as a symptom of disease rather than as a necessary phase of prolonged living.

From our point of view, it is quite possible that cancer is a constructive as well as a destructive manifestation—not of senescence or physiologic aging but of reaction to cumulative effects of injurious influences of the internal or external environment. The development of cancer may be an expression of unsuspected vigor of protoplasm and cells—a most profound exhibition of the inherent, basic tendency of all living material to respond in an adaptive manner to injurious influences. In cancer causation, chemical or physical agents are at work, and bring about degenerative changes, which would eventually destroy the cell or tissue, unless some remarkably vigorous response were forthcoming. That is, as an adaptive reaction to almost lethal injury, the degenerating cell or tissue makes an abortive attempt to counteract or even reverse the effects of the toxic agent. Under such conditions, even the most aged tissue may tap an unknown, profoundly hidden source of vigor, undergo a form of rejuvenescence, and manifest the growth momentum of embryonically youthful cells. Otherwise, tissue deterioration would continue, and lead on to the picture commonly termed senility and, ultimately, to death. It is noteworthy that often the precancerous

condition is indistinguishable from degenerative alteration usually attributed vaguely to senescence. Cancer development and the appearance of the pathology of old age may be aspects of a single basic phenomenon, the accumulated conditions and changes resulting from prolonged exposure to toxic influences. From this point of view, if cancer is unnecessary, so is "normal" senescence.

The literature of gerontology includes frequent assertions that, although isolated tissues may be kept alive indefinitely in special cultures, rejuvenescence of any human tissue has not been observed and may be assumed to be impossible. At least in the theoretical sense, however, cancer is a phenomenon which may well be regarded optimistically—insofar as it represents a phase of rejuvenescence, even if abortive. Cancer may appear in any tissue. Thus, it would seem possible that every tissue has some capacity to achieve a form of rejuvenescence and undergo growth as vigorous as cellular proliferation in embryonic development.

FURTHER, it is not inconceivable that carcinomatous degeneration may actually be a constructive condition perhaps on a plane well above that of other tissues, not cancerous, within the same organism. The other tissues may have undergone degeneration to such a profound extent as to have lost their growth-regulating influence on precancerous, proliferating tissue, whose adaptive response to cumulatively injurious influences is (attempted) healthful—if misguided and uncontrolled—replacement of damaged or "senile" tissue.

The literature on cancer presents frequent statements to the effect that cancerous growth will ultimately be controlled, when problems of growth energy of cells and growth regulation have been solved. Such statements would seem to suggest also that control of the growth momentum of neoplasms may mean great progress in wound healing, autotransplantation, and even replacement of "senescent" tissues and organs.

THE AMERICAN SOCIETY FOR THE STUDY OF ARTERIOSCLEROSIS

Statement of Policy

The purpose of the American Society for the Study of Arteriosclerosis is to further research, to improve methods of diagnosis and treatment, to work toward prevention and to disseminate reliable information relative to arteriosclerosis.

The membership is open to any scientist engaged in experimental or clinical research in the field of arteriosclerosis and related disorders. The Society seeks active cooperation with all organizations of similar aims or interested in related diseases and with any group which might be able to help in the solution of the urgent problem of arteriosclerosis.

July 1949

IRVINE H. PAGE, M.D., *President*
E. COWLES ANDRUS, M.D., *Vice-President*
Secretary: O. J. POLLAK, M.D.
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Plato's Philosophy of Old Age

John J. Griffin

IN A PREVIOUS study[1] we indicated that according to Biblical records, many of our most advanced notions about aging and the aged were anticipated to a remarkable degree, by the Hebrew peoples, even as far back as patriarchal times. Transferring our attention to an entirely different cultural milieu, namely, the Hellenic world of a few centuries before the Christian era, we are not a little surprised to discover on the part of the ancient Greeks a comprehensive interest in and a quite profound insight into the phenomena of aging. Our witness is none other than the illustrious Athenian philosopher Aristocles, better known by his nickname Plato, who was born about 427 B. C. and who himself lived to be eighty years old.[2]

The very first subject treated in Plato's principal work, "THE REPUBLIC," is old age. This noteworthy fact which may almost be said to protrude in the face of the scholar, has apparently received scant advertence. The classic dialogue, the philosopher tells us, took place in the house of Polemarchus. Casually, he observes: "There, too, was Cephalus, the father of Polemarchus, whom I had not seen for a long time, and I thought him very much aged." [3] Significantly, Plato describes the domestic scene, rich in implications; "He was seated on a cushioned chair, and had a garland on his head, for he had been sacrificing in the court; and there were some other chairs in the room arranged in a semi-circle, upon which we sat down by him." [4] What a typical picture: the venerable senior returned from the performance of his religious duties, ensconced in a *cushioned* chair! But the ensuing conversation is still more impressive. The old man, while quick to express his delight at the presence of lively young company, cannot refrain from contrasting his usual solitude and relative inactivity: "He saluted me eagerly, and then he said:—You don't come to see me, Socrates, as often as you ought: If I were still able to go and see you I would not ask you to come to see me. But at my age, I can hardly get to the city, and therefore you should come oftener to the Piraeus. For let me tell you, that the more the pleasures of the body fade away, the greater to me is the pleasure and charm of conversation. Do not then deny my request, but make our house your resort and keep company with these young men; we are old friends, and you will be quite at home with us." [5]

OBVIOUSLY, emboldened by the old man's reference to the meaning of declining years, the philosopher seizes the opportunity as it were, to question him more closely. "I replied," he says: "There is nothing which for my part I like better, Cephalus, than conversing with aged men; for I regard them as travellers who have gone a journey which I too may have to go, and of whom I ought to inquire, whether the way is smooth and easy, or rugged

and difficult. And this is a question which I should like to ask of you who have arrived at that time which poets call the 'threshold of old age'—Is life harder towards the end, or what report do you give of it?" [6] The reply given is probably unsurpassed in the whole range of psychological literature. "I will tell you, Socrates, he said, what my own feeling is. Men of my age flock together; we are birds of a feather, as the old proverb says; and at our meetings the tale of my acquaintance commonly is—I cannot eat, I cannot drink; the pleasures of youth and love are fled away: there was a good time once, but now that is gone, and life is no longer life. Some complain of the slights which are put upon them by relations, and they will tell you sadly of how many evils their old age is the cause. But to me, Socrates, these complainers seem to blame that which is not really in fault. For if old age were the cause, I too being old, and every other old man, would have felt as they do. But this is not my own experience, nor that of others whom I have known. How well I remember the aged poet Sophocles, when in answer to the question, How does love suit with age, Sophocles—are you still the man you were? Peace, he replied: most gladly have I escaped the thing of which you speak; I feel as if I had escaped from a mad and furious master. His words have often occurred to my mind since, and they seem as good to me now as at the time when he uttered them. For certainly old age has a great sense of calm and freedom; when the passions relax their hold, then, as Sophocles says, we are freed from the grasp not of one mad master only, but of many. The truth is, Socrates, that these regrets, and also the complaints about relations, are to be attributed to the same cause, which is not old age, but men's characters and tempers; for he who is of a calm and happy nature will hardly feel the pressure of age, but to him who is of an opposite disposition youth and age are equally a burden." [7]

THAT THE philosopher was not unmindful of the importance of economic factors, but nevertheless insistent on the primacy of personality, is evidenced from the pointed query with which he follows up the sage's discourse. "Yes, Cephalus, I said: but I rather suspect that people in general are not convinced by you when you speak thus: they think that old age sits lightly upon you, not because of your happy disposition, but because you are rich, and wealth is well known to be a great comforter. You are right, he replied: they are not convinced: and there is something in what they say; not, however, as much as they imagine. I might answer them as Themistocles answered the Seriphian who was abusing him and saying that he was famous, not for his own merits but because he was an Athenian: 'If you had been a native of my country or I of yours, neither of us would have been famous.' And to those who are not rich and are impatient of old age, the same reply may be made; for to the good poor man old age cannot be a light burden nor can a bad rich man ever have peace with himself." [8]

After questioning Cephalus further, as to whether his wealth was inherited or acquired, since the old man acted indifferently about money, and having

been informed that it was earned and that Cephalus intended to pass on to his sons just a little more than was bequeathed him, the philosopher formulated a query which evoked an admission that a feeling of insecurity is characteristic of old age and that to the aged no boon is comparable to a good conscience. Plato's exposition of the reflective mood of the aged, of their anxiety about the eternal future, and of their concern with moral dignity is superbly done. The philosopher's remarks about the suspicions, alarms, startling fears, ominous dreams and forebodings of the aged, suggest to us that to the aged might well be applied William James' famous phrase about being overwhelmed by "an irremediable sense of precariousness."

SOCRATES continues: "But may I ask another question?—What do you consider to be the greatest blessing which you have reaped from your wealth?" "One, he said, of which I could not expect easily to convince others. For let me tell you, Socrates, that when a man thinks himself to be near death, fears and cares enter into his mind which he never had before; the tales of a world below and the punishment which is exacted there of deeds done here were once a laughing matter to him, but now he is tormented with the thought that they may be true: either from the weakness of age, or because he is now drawing nearer to that other place, he has a clearer view of these things; suspicions and alarms crowd quickly upon him, and he begins to reflect and consider what things he has done to others. And when he finds that the sum of his transgressions is great he will many a time like a child start up in his sleep for fear, and he is filled with dark forebodings. But to him who is conscious of no sin, sweet hope, as Pindar charmingly says, is the kind nurse of his age:

"Hope," he says, "cherishes the soul of him who lives in justice and holiness, and is the nurse of his age and the companion of his journey;—hope which is mightiest to sway the restless soul of man."

"How admirable are his words! And the great blessing of riches, I do not say to every man, but to a good man, is, that he has had no occasion to deceive or to defraud others, either intentionally or unintentionally; and when he departs to the world below he is not in any apprehension about offerings due to the gods or debts which he owes to men. Now to this peace of mind the possession of wealth greatly contributes; and therefore, I say, that setting one thing against another, of the many advantages which wealth has to give, to a man of sense this is in my opinion the greatest." [9]

IT IS INTERESTING to note that after an added exchange of witticisms, Plato dismisses Cephalus on the grounds that Cephalus is desirous of returning to the sacrifice. The intimation is plain throughout that vesperal shadows have served to develop the contemplative habit in the aged man who is now preoccupied with meditations on his immortal destiny.

Since Plato is intent on drawing the blueprint of the ideal State, in later passages of THE REPUBLIC we find him, not unexpectedly, considering

age in relation to education, to medicine, to industry, to eugenics, to gymnastics, to study and to government.

Thus, Plato denounces the traditional custom of relating the legends or rather the lies as he starkly calls them, of Homer and Hesiod to innocent youth who are to be trained to be rulers. The oldsters who were the acknowledged story-tellers should reverse their patterns. "Neither, if we mean our future guardians to regard the habit of quarrelling among themselves as of all things the basest, should any word be said to them of the wars in heaven, and of the plots and fightings of the gods against one another, for they are not true. No, we shall never mention the battles of the giants, or let them be embroidered on garments; and we shall be silent about the innumerable other quarrels of gods and heroes with their friends and relatives. If they would only believe us we would tell them that quarrelling is unholy, and that never up to this time has there been any quarrel between citizens; this is what old men and old women should begin by telling children . . ." [10]

THE MANNER in which elders influence the young, especially how the gossipy aged incite aggressive avarice in striplings is reviewed during the course of comments on the corruption of timocratical youth. "The character of the son begins to develop when he hears his mother complaining that her husband has no place in the government, of which the consequence is that she has no precedence among other women. Further, when she sees her husband not very eager about money, and instead of battling and railing in the law courts or assembly, taking whatever happens to him quietly; and when she observes that his thoughts always centre in himself, while he treats her with very considerable indifference, she is annoyed, and says to her son that his father is only half a man and far too easy-going: adding all the other complaints about her own ill-treatment which women are so fond of rehearsing. Yes, said Adeimantus, they give us plenty of them and their complaints are so like themselves. And you know, I said, that the old servants also, who are supposed to be attached to the family, from time to time talk privately in the same strain to the son; and if they see any one who owes money to his father, or is wronging him in any way, and he fails to prosecute them, they tell the youth that when he grows up he must retaliate upon people of this sort, and be more of a man than his father." The ultimate result is, Plato concludes, that "while his father is wâtering and nourishing the rational principle in his soul, the others are encouraging the passionate and appetitive; and he being not originally of a bad nature, but having kept bad company, is at last brought by their joint influence to a middle point, and gives up the kingdom which is within him to the middle principle of contentiousness and passion, and becomes arrogant and ambitious." [11]

PLATO planned a career of Spartan simplicity for the trainees aspiring to be governors of the State. He was of the opinion that only the indolent rich and neurotic hypochondriacs could afford to submit to protracted medical regi-

mens. In his leviathan State, as in modern totalitarian nations, there is no room for the chronically ill. Bitterly he recalls: "Before the time of Herodicus, the guild of Asclepius did not practice our present system of medicine, which may be said to educate diseases. But Herodicus, being a trainer, and himself of a sickly constitution, by a combination of training and doctoring found out a way of torturing first and chiefly himself, and secondly the rest of the world. How was that, he said. By the invention of lingering death; for he had a mortal disease which he perpetually tended, and as recovery was out of the question, he passed his entire life as a valetudinarian; he could do nothing but attend upon himself, and he was in constant torment whenever he departed in anything from his usual regimen, and so dying hard, by the help of science he struggled on to old age." [12]

There would obviously, be no need of geriatrics in Plato's Republic, because in response to his interlocutor Glaucon's sarcastic comment: "A rare reward of his skill!", the philosopher adduces his pertinent opinion: "Yes, I said: a reward which a man might fairly expect who never understood that, if Asclepius did not instruct his descendants in valetudinarian arts, the omission arose, not from ignorance or inexperience of such a branch of medicine, but because he knew that in all well-ordered states every individual has an occupation to which he must attend, and had therefore no leisure to spend in continually being ill. This we remark in the case of the artisan, but, ludicrously enough, do not apply the same rule to people of the richer sort. How do you mean? he said. I mean this: When a carpenter is ill he asks the physician for a rough and ready cure; an emetic or a purge or a cautery or the knife,—these are his remedies. And if some one prescribes for him a course of dietetics, and tells him that he must swathe and swaddle his head, and all that sort of thing, he replies at once that he has no time to be ill, and that he sees no good in a life which is spent in nursing his disease to the neglect of his customary employment; and therefore bidding goodbye to this sort of physician, he resumes his ordinary habits, and either gets well and lives and does his business, or, if his constitution fails, he dies and has no more trouble." [13]

AFTER some additional animadversions on the status of plutocrats, the philosopher expatiates: "Therefore our politic Asclepius may be supposed to have exhibited the power of his art only to persons who, being generally of healthy constitution and habits of life, had a definite ailment; such as these he cured by purges and operations, and bade them live as usual, herein consulting the interests of the State; but bodies which diseases had penetrated through and through he would not have attempted to cure by gradual processes of evacuation and infusion: he did not want to lengthen out good-for-nothing lives, or to have weak fathers begetting weaker sons;—if a man was not able to live in the ordinary way he had no business to cure him: for such a cure would have been of no use either to himself or to the State." [14]

In Plato's paradisiac commonwealth, women are to be equal with men

in every way possible. The fundamental education of both men and women is to be in music and gymnastic. This, in practice, means that females as well as males will exercise nakedly in the public gymnasia. The philosopher, however, retained some misgivings about the general acceptability of such a recommendation. Hence we are introduced to this pungent bit of parrying:

"I should rather expect, I said, that several of our proposals, if they are carried out, being unusual, may appear ridiculous.

"No doubt of it.

"Yes, and the most ridiculous thing of all will be the sight of women naked in the palaestra, exercising with the men, especially when they are no longer young; they certainly will not be a vision of beauty, any more than the enthusiastic old men who in spite of wrinkles and ugliness continue to frequent the gymnasia." [15]

FAMILY as well as personal life in Plato's utopia is subordinate to the omnipotent State. His program of eugenics therefore, is calculated in detail, he thinks, to result in an absolutely healthy population. Only those in "the prime of life" may produce progeny for THE REPUBLIC. His ideas on "the prime of life" therefore, are explicitly established. We are invited to listen to the conferees saying:

"Let us, however, proceed with our scheme. We were saying that the parents should be in the prime of life?

"Very true.

"And what is the prime of life? May it not be defined as a period of about twenty years in a woman's life, and thirty in a man's?

"Which years do you mean to include?

"A woman, I said, at twenty years of age may begin to bear children to the State, and continue to bear them until forty; a man may begin at five-and-twenty, when he has passed the point at which the pulse of life beats quickest, and continue to beget children until he be fifty-five.

"Certainly, he said, both in men and women these years are the prime of physical as well as of intellectual vigor." [16]

The Grecian genius was quite dissatisfied with the prevailing educational curricula, and he visualized revolutionary changes for the school system of his dream-State. For one thing philosophy was taught indiscriminately and to the very young and a radical shift was planned in this regard. To learn dialectic, conceived to be the summit of philosophy, one should be mature but not aged. The aged are to enjoy unbroken leisure. We learn that:

"At present, I said, the students of philosophy are quite young; beginning when they are hardly past childhood, they devote only the time saved from moneymaking and housekeeping to such pursuits; and even those of them who are reputed to have most of the philosophic spirit, when they come within sight of the great difficulty of the subject, I mean dialectic, take themselves off. In after life when invited by some one else, they may, perhaps, go and hear a lecture, and about this they make much ado, for philosophy is

not considered by them to be their proper business: at last, when they grow old, in most cases they are extinguished more truly than Heraclitus' sun, inasmuch as they never light up again."[17]

ALL THIS is to be altered in the ideal State, the course of which is charted as follows:

"In childhood and youth they study, and what philosophy they learn, should be suited to their tender years; during this period while they are growing up towards manhood, the chief and special care should be given to their bodies that they may have them to use in the service of philosophy; as life advances and the intellect begins to mature, let them increase in the gymnastics of the soul; but when the strength of our citizens fails and is past civil and military duties, then let them range at will and engage in no serious labor, as we intend them to live happily here and to crown this life with a similar happiness in another."[18]

Plato's plan calls for philosopher—rulers, and just as he does not want them to be too young neither must they be too old. He has very definite notions about the divisions of labor and study, according to age levels. Bluntly he states: "Although in our former selection we chose old men, we must not do so in this. Solon was under a delusion when he said that a man when he grows old may learn many things—for he can no more learn much than he can run much; youth is the time for extraordinary toil."[19]

THE IDEAL age for rulers perfected in dialectics is fifty years of age according to the philosopher, and his educational scheme is oriented to attain this goal. Along with gymnastics and music "calculation and geometry and all the other elements of instruction, which are a preparation for dialectic, should be presented to the mind in childhood. . . ."[20] When the youths have reached the age of twenty, those who are intellectually adept and otherwise qualified will be allowed to advance. "Those who are selected from the class of twenty years old will be promoted to higher honor, and the sciences which they learned without any order in their early education will now be brought together, and they will be able to see the natural relationship of them to one another and to true being."[21] At thirty a further sifting will take place: "Those who have most of this comprehension, and who are most steadfast in their learning, and in their military and other appointed duties, when they have arrived at the age of thirty will have to be chosen by you out of the select class, and elevated to higher honor; and you will have to prove them by the help of dialectic . . ."[22]

Thirty is apparently considered youthful enough to be unsettled, for caution must be used in teaching advanced philosophy to persons of this age. Youths are all too likely to be heady, controversial and agnostic. It takes *time* literally, to stabilize their minds and dispositions. Aging mellows. Glaucon is reminded that: "There is a danger lest they should taste the dear delights too early; for youngsters, as you may have observed, when they

first get the taste in their mouths, argue for amusement, and are always contradicting and refuting others in imitation of those who refute them; like puppy-dogs, they rejoice in pulling and tearing at all who come near them. . . . And when they have made many conquests and received defeats at the hands of many, they violently and speedily get into a way of not believing anything which they believed before, and hence, not only they, but philosophy and all that relates to it, is apt to have a bad name with the rest of the world. . . . But when a man begins to get older, he will no longer be guilty of such insanity; he will imitate the dialectician who is seeking for truth, and not the eristic, who is contradicting for the sake of amusement; and the greater moderation of his character will increase instead of diminishing the honor of the pursuit." [23]

HAVING endured the educational regimen until his thirtieth year, the select youth is thereupon to spend five years studying philosophy and thereafter he is to return to secular pursuits for fifteen years in order that he may gain experience while at the same time his probity and ability are being tested. At the age of fifty he will be fit to assume the responsibilities of statesmanship for he will then be accustomed to viewing life "steadily and whole." Plato's reasoning is absorbingly interesting. The dialogue proceeds:

"Suppose, I said, the study of philosophy to take the place of gymnastics and to be continued diligently and earnestly and exclusively for twice the number of years which were passed in bodily exercise—will that be enough?

"Would you say six or four years? he asked.

"Say five years, I replied; at the end of the time they must be sent down again into the den and compelled to hold any military or other office which young men are qualified to hold, in this way they will get their experience of life, and there will be an opportunity of trying whether, when they are drawn all manner of ways, by temptation, they will stand firm or flinch.

"And how long is this stage of their lives to last?

"Fifteen years, I answered; and when they have reached fifty years of age, then let those who still survive and have distinguished themselves in every action of their lives and in every branch of knowledge come at last to their consummation: the time has now arrived at which they must raise the eye of the soul to the universal light which lightens all things, and behold the absolute good: for that is the pattern according to which they are to order the State and the lives of individuals, and the remainder of their own lives also; making philosophy their chief pursuit, but when their turn comes, toiling also at politics and ruling for the public good, not as though they were performing some heroic action, but simply as a matter of duty; and when they have brought up in each generation others like themselves and left them in their place to be governors of the State then they will depart to the Islands of the Blest and dwell there: and the city will give them public memorials . . ." [24]

PLATO is firmly convinced of the immortality of the soul and he remarks that even a life of seventy years is negligible compared to eternity. The following snatch of conversation is noteworthy:

"Yes, I said, my dear Glaucon, for great is the issue at stake, greater than appears, whether a man is to be good or bad. And what will anyone be profited if under the influence of honor or money or power, aye, or under the excitement of poetry, he neglect justice and virtue?

"Yes, he said: I have been convinced by the argument, as I believe that anyone else would have been.

"And yet no mention has been made of the greatest prizes and rewards which await virtue.

"What, are there any greater still? If they are, they must be of an inconceivable greatness.

"Why, I said, what was ever great in a short time? The whole period of three score years and ten is surely but a little thing in comparison with eternity?

"Say, rather, 'nothing,' he replied.

"And should an immortal being serious think of this little space rather than of the whole?

"Of the whole, certainly. But why do you ask?

"Are you not aware, I said, that the soul of man is immortal and imperishable?" [45]

WHILE Plato uses the Biblical measure of three score and ten as the normal span of life in this passage, in a later communication, he states that the spirits in the nether world at least, regard a hundred years as the standard. In a dramatic story which rivals the most impressive episodes in Virgil and Dante, Plato unfolds the experience of one Er, a soldier supposedly slain in battle, who after glimpsing the wonders of the eternal realm, returned to life. Of the souls departed: "He said that for every wrong which they had done to anyone they suffered tenfold; or once in a hundred years—such being reckoned to be the length of man's life, and the penalty being thus paid ten times in a thousand years."

It seems highly significant that in the vision of Er the profoundest depths of Hades are allocated to a tyrant who murdered his aged father. Plato deliberately focuses attention on the horrible fate of this condemned individual. Neither the Mantuan bard nor the Florentine master depicted the techniques of the stygian region more picturesquely than this: "He mentioned that he was present when one of the spirits asked another, "Where is Ardiaeus the Great?" (Now this Ardiaeus lived a thousand years before the time of Er: he had been the tyrant of some city of Pamphlyia, and had murdered his aged father and his elder brother, and was said to have committed many other abominable crimes). The answer of the other spirit was: "He comes not hither and will never come. And this," said he, "was one of the dreadful sights which we ourselves witnessed. We were at the mouth of

the cavern, and, having completed all our experience, were about to reascend, when of a sudden Ardiaeus appeared and several others, most of whom were tyrants; and there were also besides the tyrants, private individuals who had been great criminals: they were just, as they fancied, about to return into the upper world, but the month, instead of admitting them, gave a roar, whenever any of these incurable sinners or some one who had not been sufficiently punished tried to ascend; and then wild men of fiery aspect, who were standing by and heard the sound, seized and carried them off, and Ardiaeus and others they bound head and foot and hand, and threw them down and flayed them with scourges, and dragged them along the road at the side, carding them on thorns like wool, and declaring to the passers-by what were their crimes, and that they were being taken away to be cast into Hell."[27]

THERE ARE numerous other allusions to age in THE REPUBLIC. There seems to be a somewhat subtle intonation in a morsel of thought which the philosopher places in the mouth of his dialectical opponent, although it is presumably offered only as bait: "He only blames injustice who, owing to cowardice *or age* or some weakness, has not the power of being unjust."[28] In the ideal State where justice will reign, however, "the judge should not be young; he should have learned to know evil, not from his own soul, but from late and long observation of the nature of evil in others."[29] He contrasts the good man who becomes a judge to the man of "cunning and suspicious nature" who acts like a fool when in "the company of men of virtue, who have the experience of age" because he harbors "unseasonable suspicions; he cannot recognize an honest man because he has no pattern of honesty in himself."[30] In framing the constitutional provisions of the State, Plato refrains from drawing up lesser rules pertaining to such deportment as: "when the young are to be silent before their elders; how they are to show respect to them by standing and making them sit; what honor is due to parents. . . ."[31]

THE LAWS which may be considered to be a remodelling of THE REPUBLIC, occupied the last years of Plato's long life. It is the longest of the great philosopher's works and it is universally recognized as representing his maturest thought. The persons of the dialogue are three old men, an unnamed Athenian, Megallus a Spartan, and a Cretan called Cleinus. Appropriately, various aspects of old age loom prominently in the conversation.

JOWETT PARAPHRASES Book Two of the Laws thus: "There will be three choruses at our festivals, one of children, another of youth, a third of elder men from thirty to sixty; and all will utter the same strain—'that virtue and happiness are inseparable.' The aged, too who can not sing will tell stories to the like effect, as with the voice of an oracle. The elder men may be permitted some indulgence in wine, which will warm their hearts and over-

come their diffidence; to children and the young in general it will be forbidden. Our fifty year old choristers must be true judges of music, well grounded in the principles of harmony and rhythm."[32]

Veneration of parents, especially in their latter years is repeatedly inculcated by Plato who is fully persuaded that the Divinity is especially fond of the aged. In fact he proclaims that next to worship of the gods comes honor to parents. In this regard his doctrine parallels the order exhibited in the Mosaic Decalogue. The philosopher argues:

"Next comes the honor of living parents, to whom, as is meet, we have to pay the first and greatest and oldest of all debts, considering that all which a man has belongs to those who gave him birth and brought him up, and that he must do all that he can to minister to them: first in his property; secondly, in his person, and thirdly, in his soul; paying the debts due to them for the care and travail which they bestowed upon him of old, in the days of his infancy, and which he is now to pay back to them, when they are old and in the extremity of their need. And all his life long he ought never to utter, or to have uttered an unbecoming word to them; for of all high and winged words he will have to give an account; Nemesis the messenger of justice, is appointed to watch over them."[33]

The not unusual tantrums of the aged are to be understandingly indulged and departed parents are to be perpetually remembered, for "We ought to yield to our parents when they are angry, and let them satisfy their feelings in word or deed, considering that, when a father thinks that he has been wronged by his son, he may be expected to be very angry. At their death, the most moderate funeral is best, neither exceeding the customary expense, nor yet falling short of the honor which has been usually shown by the former generation to their parents; and let a man not forget to pay the yearly tribute of respect to the dead, honoring them chiefly by omitting nothing that conduces to a perpetual remembrance of them, and giving a reasonable portion of their fortune to the dead. Doing this, and living after this manner we shall receive our reward from the Gods, and those who are above us; and we shall spend our life for the most part in good hope."[34]

PLATO HAS a word of advice for the elders themselves who are to impart to youth a sense of reverence. The wise pedagogue knows that exemplary conduct is the most impressive way to teach virtue. Moreover, he frowns upon the practice of supplying the young with too much *unearned* income. He comments: "I would not have any one fond of heaping up riches for the sake of his children, in order that he may leave them as rich as possible. For the possession of great wealth is of no use, either to them or to the state. The condition of youth which is free from flattery, and at the same time not in need of the necessaries of life, is the best and most harmonious of all, being in accord and agreement with our nature, and making life to be most entirely free from sorrow. Let parents, then, bequeath to their children not riches, but the spirit of reverence. We, indeed, fancy that they will inherit

reverence from us, if we rebuke them when they show a want of reverence. But this quality is not really imparted to them by the present style of admonition, which only tells them that the young ought always to be revential. A sensible legislator will rather exhort the elders to reverence the younger and above all to take heed that no young man sees or hears him doing or saying anything base; for where old men have no shame, there young men will most certainly be devoid of reverence. The best way of training the young, is to train yourself at the same time; not to admonish them, but to be seen always doing that of which you would admonish them."[35]

The philosopher moreover, very shrewdly observes that the aged are sometimes to blame for their solitude and desolation. "Truth" he asserts, "is the beginning of every good to the Gods, and of every good to man; and he who would be blessed and happy, should be from the first a partaker of the truth, that he may live a true man, as long as possible, for then he can be trusted; but he is not to be trusted who loves voluntary falsehood, and he who loves involuntary falsehood is a fool. Neither condition is to be desired, for the untrustworthy and ignorant has no friend, and as time advances he becomes known, and lays up in store for himself isolation in crabbed age, when life is on the wane: so that whether his children or friends are alive or not, he is equally solitary."[36]

There are no atheists among the aged, in Plato's mature judgment. Speaking relevantly, he observes: "There have always been persons more or less numerous who have had the same disorder. I have known many of them and can tell you this, that no one who had taken up in youth this opinion, that the Gods do not exist, ever continued in the same until he was old; the two other notions certainly do continue in some cases, but not in many; the notion, I mean, that the Gods exist, but take no heed of human beings, and also the notion that they do take heed of them, but are easily propitiated with sacrifices and prayers."[37]

BUT IT IS to the care which children should give their aged parents that Plato returns again and again. He states directly that the divinities would be more efficaciously worshipped by a practical demonstration of solicitude for the aged, than by decoration of the home with images of the household gods. The intensity of the dialectician's sentiments on this score is exhibited in the following exchange:

". . . Some of the Gods we see with our eyes and honor them, of others we honor the images; raising statues of them which we adore; and though they be lifeless, yet we imagine that the living Gods have a good will and gratitude to us on this account. Now, if a man has a father or mother, or their father or mother treasured up in his house stricken in years, let him consider that no statue can be more potent to grant his requests than they are, who are sitting at his hearth, if only he knows how to show true service to them.

"And what do you call the true mode of service? . . .

"Oedipus, as tradition says, when dishonored by his sons, invoked on them the fulfillment of those curses from the God which every one declares to have been heard and ratified by the Gods, and Amyntor in his wrath invoked curses on his son Phoenix, and Theseus upon Hippolytus, and innumerable others have also called down wrath upon their children, which is a plain proof that the Gods listen to the imprecations of parents against their children; for the curses of a parent are, as they ought to be, mighty against his children as no others are. And shall we suppose that the prayers of a father or mother who is specially dishonored by his or her children, are heard by the Gods in accordance with nature; and that if a man is honored by them, and in the gladness of his heart earnestly entreats the God in his prayers to do them good, he is not equally heard, and that they do not minister to his request? If not, they would be very unjust ministers of good, and that we affirm to be contrary to their nature."[38]

THE MEDIATORIAL power of parental prayers cannot be overemphasized in Plato's estimation. Hence he continues, insisting:

"May we not think, as I was saying just now, that we can possess no image which is more honored by the Gods, than that of a father or grandfather, or of a mother stricken in years? whom when a man honors, the heart of the God rejoices and he is ready to answer their prayers. And truly, the figure of an ancestor is a wonderful thing, far higher than that of a lifeless image. For when they are honored by us, they join in our prayers, and when they are dishonored, the utter imprecations against us; but lifeless objects do neither. And, therefore, if a man makes a right use of his father and grandfather and other aged relations, he will have the best of all images which can procure him the favor of the Gods.

"Every man of understanding fears and respects the prayers of his parents, knowing well that many times and to many persons they have been accomplished. Now, these things being thus ordered by nature, good men think that they are the gainers by having aged parents living, to the end of their life, or if they depart early, they are deeply lamented by them. . . ."[39]

IN AN excellent commentary designed primarily to interpret THE LAWS, the scholarly Oxonian Jowett actually summarizes several of the significant points indicated by Plato's elaborately developed "philosophy of old age." The erudite authority affirms:

"The respect for age which is everywhere apparent in the Laws may be partly explained by the natural feeling of Plato, writing in the decline of life; but it is also, we can not doubt, due to the influence which Spartan customs and institutions exercised over his mind. The sentiment had a strong hold in a community which preserved so many traces of the patriarchal age of society wherein the eldest bore rule, 'Because with them government originated in the authority of a father and mother.' In the busy city life of Athens, the

elder was apt to be pushed aside by his younger and stronger rival; and we observe a similar tendency in the democratic nations of modern times.

"At Athens, however, the worship of ancestors still underlay the whole fabric of social and domestic existence, and, probably, as in some Eastern countries, may have retained vitality when other parts of the national religion were in more or less complete decay; and this primitive belief must have helped to maintain a degree of consideration in the young towards their parents and elders. Such a disposition was most welcome to Plato, both for its own sake, and because it would encourage the mildness of temper and subordination to authority which he desired to see incorporated in the citizens of his new State."[40]

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GERIATRICS

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*New Goals for Old Age**

SINCE the turn of the century the population of the United States has been undergoing changes at an accelerating rate. Not only is the total number increasing, but the structural pattern is changing as well. We now have many more old people among us and, as time goes on, this elderly group will represent an ever increasing percentage. There are now about 12 million people over 65 years of age. The percentage increase of our aged during the past ten years has been five times as great as the percentage increase of the total population. In 1980 it is estimated to be 15 per cent, while in 1900 those over 65 years of age made up only 4 per cent of the population.

These changes have been brought about by many factors. Some of these are: higher standards of living, better medical care, improved public health services, curbing of immigration and declining birth rate.

This growing number of elderly people is having very serious effects on the social and economic life of the nation. The present cost of our old age assistance program is several billion dollars per year. This amount is expected to increase to about 8 billion dollars in 1980. Because of the attitude of industry toward older workers, we are witnessing a growing army of idle, useless and deteriorating old people. Our present inadequate housing forces many of these elderly to live their remaining years in small, drably furnished rooms or in crowded quarters with their children.

There are two types of aging, chronologic aging and physiologic aging. Some individuals at 65 are physiologically younger than others at 50. The character of old age depends to a great extent on what happens to an individual during middle age. It is

*A summary of a lecture presented at the Mount Sinai Hospital of Chicago Health Forum, on March 22, 1949.

during the period of 45 to 65 that so many of the degenerative diseases have their beginning. The prevention and control of these diseases are important factors in the attainment of a happy old age. These ailments may be classified under the following headings: circulatory, metabolic, blood, joints, mental and tumors. Geriatrics concerns itself with the prevention, control and treatment of the above conditions in the aging and aged.

In dealing with people past 65 years of age certain needs stand out as essential to their welfare. These needs are the New Goals for Old Age:

1. Good modern medical and psychiatric service to prolong health as well as life.
2. Adequate and decent shelter.
3. Opportunities to be useful.
4. Social security and old age assistance.
5. Facilities for the care of the chronic sick.
6. Opportunities to earn.
7. Opportunities for leisure time activities.

The above goals primarily concern the present aged, but the welfare of the future old people calls for a program of preventive treatment. This should be instituted during middle age and requires the participation of three groups: physicians, society, and individuals.

The doctors can be of value in the fields of medical research, education, prophylactic and active treatment. Society must provide the money, hospitals and other essential facilities. It must influence industry to employ the elderly and those partially disabled. The individual, too, can be of help in many ways. He must realize that health is his own personal responsibility and should go to his physician for regular periodic examinations. He should realize the limitation of age and avoid unusual stresses and strains. Competitive sports are dangerous to the circulatory system. Aging people need frequent rest periods. Weight control is important in the prevention of many of the degenerative diseases. The period between 40 and 60 is a good time to become interested in leisure time activities such as hobbies, adult education, social service work and so forth.

Geriatrics is becoming an ever greater part of the practice of medicine. As the number of old people increases, the prevalence of degenerative disease increases. The changes now going on in our population structure are having serious effects on the social and economic life of our nation. We must meet this challenge by advocating new goals for old age. To make these goals more effective for our old people of tomorrow, preventive measures should be instituted among our middle age population of today. Only then can we truly say that we are not only adding years to life, but life to years as well.

Herman N. Kamin, M.D.

Chief, Geriatric Clinic, Chicago Medical School

IN MEMORIAM

LUCIEN STARK, M.D.: First President of the American Geriatrics Society 1882-1949

LUCIEN STARK of Norfolk, Nebraska, died on January 11, 1949. He was a family physician who lived up to the highest medical standards. A doctor who lived to serve; he gave loving care to those who came to him, not only for medical advice and help, but for friendly advice and assistance.

Lucien Stark was an integral part of the Nebraska State Medical Association, a great believer and active worker in the field of organized medicine. He held every office in the Nebraska State Medical Society and was the first chairman of the section on general practice of the American Medical Association when the section was initiated in 1942.

Lucien Stark was the first president of the American Geriatrics Society which held its first meeting in Atlantic City in June, 1942. He was one of the founders of the society and was keenly interested in geriatrics and in the society's welfare. He had a long experience treating the aged.

He had an investigative mind. He listened to his patients' hearts until they were stilled, then he studied them at autopsy. It is only fitting at this time to do an "autopsy" on him, hoping the result might be of some benefit to other physicians.

We learn much about him through some of his letters. On November 10, 1948, he wrote: "I awoke with rather a severe pain around my chest and had to sit up in bed in order to get by. Thank heavens, I had some nitroglycerin tablets in the house and I got some and after the third one hundredth I got so that I could breathe again and finished out the night. It was all right but I had a repetition the next day and for several days thereafter, I joined the burglar's union and carried my own nitroglycerin with me and still do. This sort of straightened out for most of the time but I was having four or five attacks in the 24 hours that required nitroglycerin. So I decided to do something about it. I got the idea that to cut thirty pounds off might help; also to do about one-half the work that I was doing, and to do whatever I was doing a little more slowly."

DR. STARK graduated from Creighton Medical College in 1903. He did post-graduate work in the New York Post-Graduate Medical School in 1910. He was in the Spanish-American War, a seaman, U. S. N. in 1898-1899. In World War I, he was a captain in the Medical Corps. Among the positions he has held was district surgeon C. and N. W., also U. P. R. R. He was past president of the American Railway Surgeons and also on the board of Medical Examiners in Nebraska from 1915 to 1917. He was author of many worthwhile medical articles published in various medical journals. He was past commander of the American Legion and was enthusiastic about the 40 and 8. He was one of the founders of the American Diabetic Association and also of the American Heart Association. His writings on the aged heart were very valuable.

His one wish was to live, practice and die in Nebraska. A man of such force could not be felled easily; coronary thrombosis put an end to his energy, but he went the right way. He was a good man who had done good work and will long be remembered by the medical profession.

By John W. Shuman, Sr., M.D., Santa Monica, California, and Malford Thewlis, M.D., Wakefield, Rhode Island

Book Review

GERIATRIC MEDICINE: The Care of the Aging and the Aged. Edited by Edward J. Stieglitz, M.S., M.D., F.A.C.P. Ed. 2, Philadelphia: W. B. Saunders Co., P. 773. 180 Illustrations. 1949.

In the second revised edition of this valuable work on geriatric medicine, Stieglitz has again given us the work of forty-seven outstanding specialists. Each one has written a chapter on his own specialty. Stieglitz has written five chapters. The remainder has been taken care of by the following: J. Burns Amberson, Harry E. Bacon, Edward L. Bortz, Herbert C. Brenhaus, James Barrett Brown, Carl D. Camp, Anton J. Carlson, Nathan S. Davis III, James B. Eyerly, Frederick C. Fishback, Minot P. Fryer, E. C. Hamblen, Robert H. Herbst, Frank Hinman, Frank Hinman, Jr., Raphael Isaacs, Chester S. Keefer, Seruch T. Kimble, Ralph T. Knight, Richard Kovács, Louis B. Laplace, Robert R. Linton, G. Haven Mankin, James W. Merricks, Catherine C. Miles, Walter R. Miles, Robert T. Monroe, Jean Oliver, Winfred Overholser, Percy S. Pelouze, George Morris Piersol, Walter S. Priest, Arthur W. Proetz, Herbert Rattner, Hobart A. Reimann, Benjamin Rones, William H. Sebrell, Howard B. Sprague, Arthur Stiendler, William D. Stroud, John H. Talbott, Frank C. Val Dez, Joseph A. Wagner, Irving S. Wright, and Frederic D. Zeman. The section on Medicolegal Aspects of Senility was ably taken care of by A. Warren Stearns.

The book is arranged in the following sections: 1. General Considerations. 2. Diseases of Metabolism. 3. Disorders of the Mind and Nervous System. 4. Disorders of the Respiratory System. 5. Disorders of the Circulatory System. 6. Disorders of the Alimentary System. 7. Disorders of the Genitourinary System. 8. Disorders of the Skeletal System. 9. Disorders of the Cutaneous System.

Stieglitz has written the following

chapters: Foundations of Geriatric Medicine, Principles of Geriatric Medicine, Medical Care of Normal Senescents, Hypertensive Arterial Disease and Hypotension, and The Nephropathies (with Seruch T. Kimble).

With such an outstanding list of physicians and scientists one could expect an outstanding contribution. The editor and his contributors have well succeeded in a volume packed with valuable information which can be utilized by the general practitioner or specialist if he is seeing senescent patients.

Revision of the book has been complete and brought down to the minute. Much new material has been added especially in connection with the care and guidance of normal aging and aged patients.

Stieglitz does not advocate geriatrics as a special branch of medicine but rather an application of understanding of the changes which come with senescence to all the knowledge of medical practice. All physicians are aware of the increasing number of older patients. The problem of handling them has become an imperative one. Social factors involving the aged have become important in everyday life.

The publishers have made an excellent volume. The narrow margins on each page have eliminated any waste of space. The printing, general layout, type, and illustrations are very well done. Malford Thewlis

Geriatrics Laboratory Founded

DR. ROBERT W. KLEEMEIER, now Professor of Psychology at Northwestern University, has accepted the position as Director of the newly established laboratory for gerontology and geriatrics at Moosehaven, Florida, the city for the aged maintained and operated by the Loyal Order of Moose fraternity for the past 25 years. His appointment becomes effective September 15th. The members of the National Advisory Council for Research at Moosehaven, with fields represented, are: Dr. Anton J. Carlson, Professor Emeritus of Physiology, The University of Chicago (physiology), Chairman; Dr. Ernst P. Boas, New York City (internal medicine); Dr. Ernest W. Burgess, Department of Sociology, The University of Chicago (sociology); Dr. George Lawton, New York City (gerontology); Dr. S. L. Pressey, Department of Psychology, Ohio State University (psychology of aging); Dr. Lowell S. Selling, Orlando, Florida (mental hygiene); Dr. N. W. Shock, U. S. Public Health Service (gerontology); Mr. Louis J. Haas, New York Hospital, Westchester Division (occupational therapy); and Dr. Martin L. Reymert, Director, The Mooseheart Laboratory for Child Research (psychology), who is charged with the supervision of all research activities of the Moose fraternity.

The Advisory Council recommends that the research objectives of the new laboratory should be the investigation of the physical, nutritional, social, educational and emotional factors contributing to the improvement and maintenance of mental health in the aging population, as well as research in all processes of aging. According to Mr. Malcolm R. Giles, Executive Director of the Loyal Order of Moose, when the laboratory is well-established the fraternity would like to extend this laboratory's facilities to all national research bodies and individuals who would want to avail themselves of the rather unique opportunities for study in this model city for the aged.

DIGESTS *from Current Literature*

Senile Deterioration of the Central Nervous System.

TREVOR H. HOWELL, *Brit. M. J.* pp. 56-58 (Jan.), 1949.

Pupillary reactions, superficial reflexes, and tendon jerks are often defective in healthy people of sixty-five years or more. Dysmetria and patchy analgesia are not uncommon, and vibratory perception may be absent in the sacrum and lower limbs.

Trevor H. Howell warns against mistaking natural motor and sensory losses of age for serious disease of the central nervous system. Although deterioration is varied and widespread, location of the anatomic site is difficult or impossible.

To determine what senile changes can be expected, neurologic tests were performed on 200 healthy men sixty-five to ninety-one years old. The majority were personally and professionally known to the medical examiner and willing to cooperate.

Tendon reflexes. Supinator, triceps, biceps, knee, and ankle jerks were reviewed. Only 7 per cent of elderly persons, all in the younger group, retain all reflexes. Arm reactions are generally elicited below the age of seventy but ankle jerks in less than half of the cases even in this period. All reflexes tend to disappear after seventy, but only ankle jerks are further decreased during the next fifteen years.

Superficial reflexes. Abdominal reactions remain intact in less than half of men aged sixty-five or more and deteriorate considerably after the ages of seventy and eighty-five years. Upper quadrants are more responsive than lower, with no constant difference between right and left sides. Plantar response is undiminished in 95 per cent of elderly subjects although a few losses are noted in the group between seventy and eighty-four.

Muscular power. Strength of grip and ability to flex and extend the limbs at elbow and knee are very good though not excellent in 40 per cent of elderly men under seventy, in 13 per cent from seventy to seventy-five, and in none over eighty-five. Power remains good in nearly half of all above sixty-four and fair in about a third.

Joint sense of position. When the great toe is moved on each side after an interval of irregular movement, most subjects recognize direction without difficulty.

Nose touching. About 1 in 5 individuals aged sixty-five to ninety-one cannot touch the nose with eyes shut. Dysmetria usually involves both hands or if only one, the left oftener than the right.

Rotation of wrists. Movement sometimes cannot be performed, apparently because the exercises are unfamiliar, but disability increases with age.

Sense of pain, temperature, touch. Nearly one-fourth of aging persons fail to register one or more sensations. Losses are most frequent in the group between seventy and eighty-five, and anesthesia usually affects the inner surfaces of forearms and shins.

About two-fifths of the deficient subjects are unable to sense pain in some part of the body, two-fifths temperature, and one-fifth touch. The feeling of deep pain was not tested. Senses of superficial pain and temperature may be decreased separately or over the same area.

Cranial nerves. Functions of the first, second, and eighth nerves were not tested. External rectus muscles are occasionally paralyzed and pupillary

reactions are frequently defective; muscles react to light alone, accommodation only, or neither. The pupil is more likely to be small than dilated. Reactions are often missing before the age of seventy, and after eighty-five the pupil is completely inert in two-thirds of the cases.

The widely scattered sensory and motor losses suggest patchy but progressive dissolution of nerve tissue. However, some changes may be purely functional.

Incontinence of Urine in the Aged.

THOMAS S. WILSON, M.D., *Lancet*, 265:373 (Sept.), 1948.

Frequency of urination and incontinence in the aged is due to overactivity of the neuromuscular mechanism of the bladder rather than to weakness of the sphincters. Since organic changes and deterioration of the central nervous system is common in that age group the individual may be quite unaware when the bladder is overdistended. A lack of sensation from the bladder, accompanied by diminished cortical bladder control, results in a more or less automatic bladder which reacts almost entirely through local reflexes.

Thomas S. Wilson, M.D., reports that in many cases of incontinence in the elderly, return of sensation may be induced and continence reestablished by gradual distension of the bladder with sterile fluid and by re-education of the inhibitory control of the patient. It is necessary to correct local irritative conditions of the bladder and its outlet, as well as prostatic enlargement where this is present, for the treatment to be fully effective. Toxemia and cerebral anoxia due to any cause, such as congestive heart failure or severe anemia, also tend to impair bladder inhibitory power and require active treatment. The most difficult cases of all to treat are those with so much cerebral change as to be semisomnolent. Ordinarily, chronic cystitis in the elderly does not lead to urinary incontinence but acute infection of the bladder does.

The technic of treatment consists of instilling a 1:1000 solution of potassium permanganate into the bladder at the rate of 10 cc. a minute. The total volume injected should not exceed 400 cc. As the catheter is installed residual urine is withdrawn and measured, resistance to the passage of the catheter is noted as an indication of urethral obstruction, and, in women, the vagina and urethral orifice are observed to discover cystocele, retrocele, or senile vaginitis. Such conditions contribute to hyperirritability of the neuromuscular mechanism of the bladder. During the filling of the bladder the patient is constantly urged to inhibit contractions. If the inhibitory pathways are intact, considerable discomfort is experienced by the patient as the bladder overdistends. This discomfort the patient finds to be relieved by voluntary bladder inhibition. This is the basis of the re-educative process.

Improved urinary control is rather unlikely in patients with behavior disorders. They cannot be re-educated to exercise the voluntary control which is the goal of this type of treatment. In cooperative individuals the re-educative process is successful because bladder contractions do not appear until an appreciable interval after the sensation of vesical distention and desire to void has been felt. Reduction of the quantity of residual urine facilitates regained bladder control.

Acute Abdominal Disease in the Aged.

WILLIAM C. BECK, M.D., F.A.C.S., *S. Clin. North America*, 28:1361-1369 (Oct.), 1948.

Although acute abdominal conditions occur most often in youth and middle age, a large percentage of patients is over 65.

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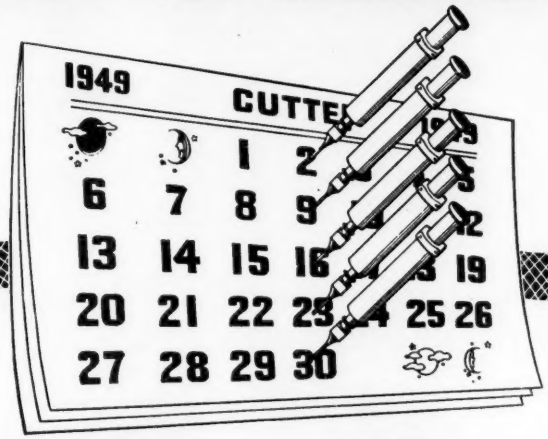

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William C. Beck, M.D., states that the elderly patient delays hospitalization, and coupled with a lowered cardiac and renal reserve, surgical intervention can be more serious.

Cholecystitis, strangulated hernia and other types of bowel obstruction are the most frequent ailments. Diverticulitis and resulting complications, appendicitis, perforations and other complications of peptic ulcer are not infrequent.

In the aged, acute cholecystitis is prone to produce a diffuse pain centered lower in the abdomen than usual. Radiation of pain often is to the upper lumbar vertebrae. Tenderness is rarely localized. Muscle guarding is frequently diffuse. Fever may be absent. The leukocyte count usually is unreliable.

Rupture of the gall bladder is more prone to occur in the aged, and the tendency is toward generalized peritonitis.

Conservative therapy is indicated, but operation must be resorted to if the patient shows no sign of definite improvement.

Subacute obstructions often may be relieved by enemas. Chemotherapeutic and antibiotic agents allow preparation for surgery without resort to a decompressive procedure.

Complete obstruction invariably requires decompression.

The cause and site of obstruction is elusive. The ileocecal valve frequently is incompetent, thus making roentgenogram interpretation difficult. Barium enema studies are of real value.

Reduction of incarcerations or strangulated hernias is attempted first by taxis, but only if pressure on the sac is not painful. The patient is placed in Trendelenburg position for 15 minutes prior to manipulation. Operation otherwise must be performed.

One of the most frequent diseases is colonic diverticulitis. The classical history consists of recurrent left lower abdominal pain often associated with alternating diarrhea and constipation. In many respects acute appendicitis is simulated.

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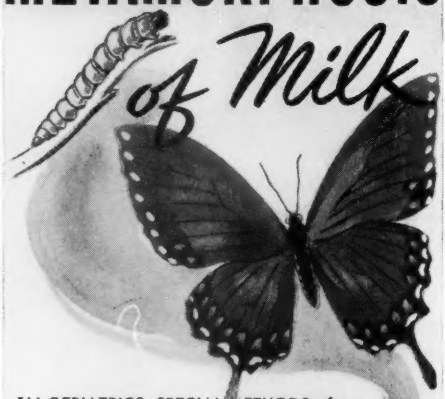

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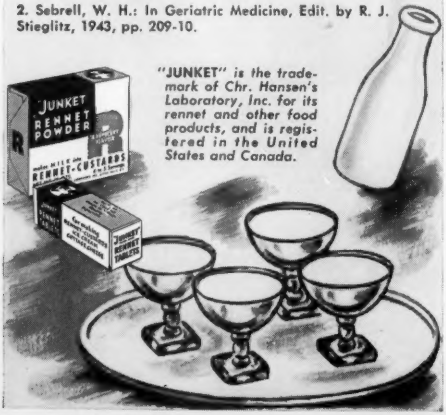
1. Brown, S. A.: In Problems of Aging and Old Age, 1928-1929, p. 1090.

2. Sebrell, W. H.: In Geriatric Medicine, Edit. by R. J. Stieglitz, 1943, pp. 209-10.



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mediate surgery is indicated. In the face of a localized or nonperforated diverticulitis, conservative therapy usually is adequate.

Acute appendicitis must always be considered.

Perforated peptic ulcer is not infrequent. Careful distinction must be made between duodenal and gastric ulcers.

Biopsy of gastric ulcers should be made to determine the existence of cancer.

In all cases, the importance of maintaining the nutritional status, careful evaluation of cardiac and renal status, and the institution of early ambulation is stressed.

Elective Surgery in the Aged.

DONALD GUTHRIE, M.D., F.A.C.S. and JOHN S. NILES, JR., M.D., F.A.C.S., *S. Clin. North America*, 28:1341-1350 (Oct.), 1948.

Elective surgery is feasible among the aged providing a careful investigation of the organic reserve is undertaken and each case properly evaluated.

Donald Guthrie, M.D., F.A.C.S. and John S. Niles, Jr., M.D., F.A.C.S. of Sayre, Pennsylvania, point out that the following factors must be considered: 1) normal life expectancy of the patient, 2) discomfiture of the patient, 3) the patient's home environment, 4) operative mortality, 5) the patient's physiologic reserve and resilience.

The patient's psychologic make-up together with his backgound is an important factor. The longevity and hardiness of the family stock must be considered.

Almost all patients will have cardiorenal disease. Estimation of the general reserve of the patient and the ability to withstand an operative procedure is dependent on mature clinical judgment.

The preoperative period is employed to return the patient to a state of optimum physiologic and emotional balance. Diabetes is brought under control with insulin. Cardiac arrhythmias are regulated with digitalis, glycosides, quinidine. Diuretics are used as indicated.

The nutritional status is usually poor

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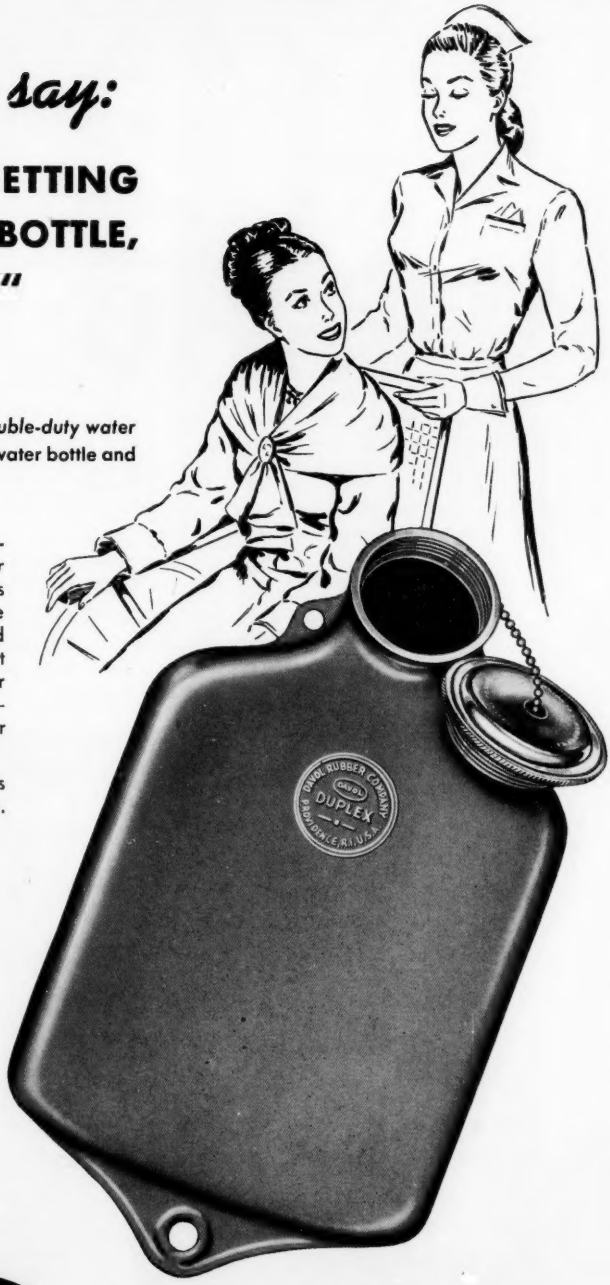

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and must be corrected. Enemas are frequent and are corrected most easily by the use of blood transfusions. Frequent small transfusions are preferred.

The patient should be allowed to have opportunity to become accustomed to his new hospital environment and encouraged to move about. The whims of the patient are observed where possible. Habitual practices in the use of alcohol and tobacco are not proscribed.

Anesthetics are important. Combinations of several carefully selected anesthetic agents in proper sequence usually are preferred.

The incision is planned to provide maximum exposure. Tissue handling is kept to a minimum. Packs and sponges are avoided wherever possible. Hemostasis must be secure. Wounds are closed carefully layer by layer. Delay and indecision during the procedure will increase mortality and morbidity.

Anticipation of complications is important in the postoperative period.

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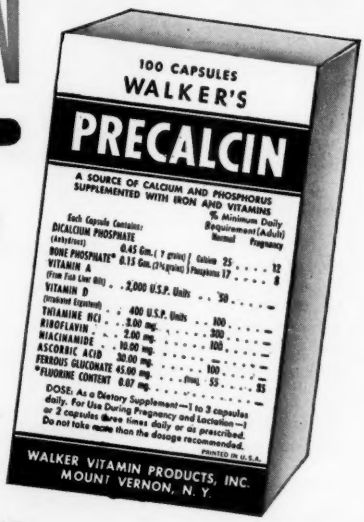
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1. Meyer, J.: *Clinical Problems of the Ageing and Aged. M Clin. No. Amer.* 32:225-229 (1948).

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Address to American Geriatrics Society*

Hollis E. Clow, M.D., PRESIDENT†
WHITE PLAINS, NEW YORK

IT IS INDEED a very great pleasure for us all to be present here at the dinner of the Sixth Annual Meeting of the American Geriatrics Society. Although our society itself might be considered still to be at the pediatric rather than the geriatric age, we can perhaps be excused for a measure of reminiscence on the progress we have made, as well as for a brief thought on the problems of the present and future.

First of all, however, I would like you to join me in paying tribute to our retiring President, Dr. Edward B. Allen, who has been and will remain a devoted member of this society. For the past two years as president he has given freely of his time in spite of the many demands of his various interests and responsibilities. From the inception of the society he has been active in arranging excellent meetings, has travelled about the country answering calls for papers on geriatrics, and as a splendid diplomat at large has carried on the work of the organization. It is fortunate that he is at the age when we can expect him to be active in this society for many years to come. One of my pleasures has been my association with Dr. Allen and I look forward to working with his continued cooperation.

This society has grown from a handful of men who met at this hotel in June, 1942. Since that time there has been a steady and healthy growth in congenial members who are interested in our work and aims. We now number 206 members and 44 associates from various parts of this country and abroad. From the first, Dr. Bainbridge particularly was interested in memberships from among his foreign friends and today we are in fact an international medical society.

*Read at the Sixth Annual Meeting, American Geriatrics Society, Atlantic City, N. J., June 3, 1949.

†Director of Laboratories and Internist, New York Hospital, White Plains, N. Y.

From abroad there is an increasing interest in our work. Our Fellows in England, Spain, Chile and other countries represent a broadening of our activities. We are receiving visitors from foreign countries who are desirous of our cooperation which we are glad to extend to them wholeheartedly. The work of Dr. Trevor H. Howell in England and that of Dr. Vazquez of Madrid deserve special attention.

Many Fellows and Associates have been active in the society's affairs during the past year. Among those who deserve special credit are Dr. Joseph T. Freeman, Dr. William J. King, Dr. Richard J. Kramer, Dr. Harold W. Lovell, Dr. John W. Shuman, Sr., Dr. E. T. Gale, Dr. Edward J. Stieglitz, Dr. Willard O. Thompson and Miss Ollie Randall. Preeminently perhaps we honor the continued work and guidance of our secretary, Dr. Malford W. Thewlis, who, as a moving force in the creation of our society, has always taken its welfare very closely to his heart.

The American Geriatrics Society has been, and is, essentially a clinical group which is studying the aging process from the point of view of clinical prevention, treatment, management and research. It has seemed wise to keep it a strictly medical society. Our experience has confirmed the practical need and usefulness of such a society. Our magnificent clinical programs have been a great source of stimulation and education to our members and associates, who are mostly engaged in taking care of elderly persons. Our contributions have been well presented to the profession by our journal, while the quality of the articles has aroused favorable comment from sources outside the society. Other important investigations of the processes of aging are being well considered, especially by members of the Gerontological Society. This group of scientists, many of whom are not physicians but who are distinguished in other fields, is making valuable contributions especially to basic science. It is hoped that there will be more and more communications between the two societies.

MANY persons inquire as to what constitutes the geriatric period of life. A concise delineation of this period is apparently as impossible as that of childhood or maturity and may differ to some extent depending on the individual as well as on the point of view of the investigator. The term, however, is generally useful and meaningful in denoting the declining years. My own impression is that the geriatric period would be considered arbitrarily by most people to start at the age of 60, although many persons at this age would believe that it commenced considerably later. Dr. Thewlis has, for practical purposes, considered the period from physical maturity, which occurs at about the age of 20, and extending to the geriatric period as the "preclinical period" which is the propitious time for the practice of preventive geriatrics. Incidentally, Dr. Thewlis considers the actual geriatric period to commence at the age of 40. At the age of 20 I could have concurred with his good reasons but since passing the age of 40 I have taken some liberties in my interpretations. Perhaps we should try to establish a standard

nomenclature in this regard although the conception is much more important than the definition.

Many articles have appeared in the lay press about geriatrics which are sometimes, as in the case of other medical subjects, regretfully misleading. The newness of the subject seems to appeal to writers and to the public. Perhaps in the near future some suitable system of press releases will be found to insure the newspapers of the correct news and implications of the work of this society. This might be done by the Educational Committee.

A word of appreciation should be made about our associates. The activities in the associated fields of geriatrics—social workers, hospital and sanitarium superintendents and others—are extremely important. We have been favored by an active group which has contributed to geriatrics. As time goes on, we hope to hear more from our associates. Perhaps in the near future we shall have a symposium from them, which I am sure would be most instructive.

THE study of geriatrics psychologically offers the same universal appeal as the search for the ancient Fountain of Youth, but we hope now with more practical potentialities. Demand for geriatric attention is increasing. On the preventive side there seems to be a special desire on the part of the public for complete physical examinations of healthy people, with a survey and an outline of the vulnerable points and information as to how to prevent disorders in the future.

The contributions as well as the conversations at each annual meeting, I am sure, stimulate anew our endeavors to provide the possibilities for a longer, happier and more useful life. The feelings of one of our members who is a physician in Pennsylvania were recently expressed as well as demonstrated by his letter to the Secretary. He regretted his inability to attend this meeting but enclosed a check "to help carry on the valuable work that the society is doing."

*Analysis of Plasma Protein**

PLASMA PROTEIN LEVELS in healthy old people may differ from those of young adults. Henry A. Rafsky, M.D., and associates made electrophoretic analyses for men and women between 70 and 95 years of age at the Hospital and Home of the Daughters of Jacob, New York City. In 67 per cent of subjects beta globulin, the lipid-bearing fraction, is increased. Gamma globulin and alpha globulin are normal. The albumin-globulin ratio is under 1.5 in over half the cases, plasma albumin less than 55 per cent of total protein in almost half, and total globulin over 33 per cent in about three-fourths.

*An Electrophoretic Analysis of the Plasma Proteins in the Aged, Am. J. M. Sc. 217: 206-210. 1949.

Endocrine Treatment of Alcoholism*

John W. Tintera, M.D.,† *and Harold W. Lovell,* M.D.‡

Alcoholism is a psychobiological disorder of such huge proportions that approximately three-quarters of a million people in the United States alone are incapacitated by it and at least two million others seriously affected. Happily, alcoholism has been graduated from the category of moral and social dereliction and assumes now its rightful position among the growing and more serious medical problems of our time.

The allergy-like reaction of alcoholism may affect the young patient just as severely as his elder but youth withstands better the ravages of alcoholism. This is shown by the average age for both men and women falling between the fourth and fifth decades in our series of 200 chronic alcoholic patients. The proportion of one's life involved and one's sensitivity to alcohol appear to be more important than the actual quantity of alcohol consumed or the number of years spent consuming it.

Like many other diseases which are not clearly understood, a tremendous number of etiologies, pathologies, and therapies for alcoholism have been reported over the years without any particular theory or treatment standing the test of time. It would appear that alcoholism like fever is symptomatic of an almost limitless variety of causes and that therapeutic generalizations are dangerous. Psychoanalysis and the broader psychiatric concepts of therapy have been relatively ineffective.[1] The so-called aversion treatments are not without danger,[2,3] contribute little to the understanding of the disorder, and leave much to be desired therapeutically. It has become necessary to change our thinking regarding the role of vitamins in alcoholic neuritis and other manifestations of ethylism. Lowry, Sebrell, Daft and Ashburn[4] have shown that alcohol may actually decrease the thiamin requirement for its metabolism and Moore[5] reports that "symptoms of deficiency in chronic alcoholic patients stem from inadequate nutrient intake, not from alcohol itself."

CLASSIFICATION

In our work with alcoholic patients, we were impressed by two relatively distinct groups whom we have classified separately as a matter of expediency in explaining the basic concepts of this study. The first consisted of a large number, particularly among the younger males, who were asthenic in habitus with soft, smooth faces and little or no chest hair, hypotensive, and not infrequently gynecomastic. All of the alcoholic patients with this consti-

*Read at the Sixth Annual Meeting, American Geriatrics Society, Atlantic City, N. J., June 4, 1949.

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tutional make-up, and most non-alcoholic controls having the same so-called allergic diathesis, revealed the triad of hypoglycemia, low 17-ketosteroids and low androgens. It became clear that we were dealing with varying degrees of hypoadrenocorticism and that individuals so constituted or so afflicted usually report a low tolerance to alcohol from the time they first begin its use. These individuals appear to be the most susceptible and the most likely to become alcoholic at an early age. Fortunate for many is their early awareness of "sensitivity" to alcohol and disciplined avoidance of it.

The second group was comprised of those individuals without pre-existing hypoadrenocorticism who, through alcoholic indulgence for a sufficient period, caused eventual damage to the adrenal cortex and to the other associated glands involved with the metabolism of carbohydrates. Lloyd and Williams[6] showed that there was a decrease in lipoid content of the adrenals in almost all cases of alcoholic cirrhosis examined at autopsy. Selye[7] reported that certain conditioning processes such as worry, grief or other alarming stimulus together with alcohol will produce hypertrophy of the adrenal cortex and eventually hypoadrenocorticism. Both classes of patient, therefore, though constitutionally different, reveal sooner or later the same type of glandular imbalance.

Almost all patients in an acute stage of alcoholic intoxication were found to have a relative lymphocytosis. Recently Thorn[13] and others have shown that adrenocorticotrophic hormone decreases the number of circulating lymphocytes releasing antibodies. This is further evidence that the adrenal gland is involved with alcohol sensitivity.

IN THIS study of alcoholic patients, hypoglycemia was found universally during their "dry" periods. The average fasting blood sugar level was 60.9 mg. per 100 cc., the range varying from 54 mg. to 80 mg. per 100 cc. The glucose tolerance curve characteristically began with a subnormal value, rose rapidly to a moderate hyperglycemic level forming a plateau and then—in about two hours—suddenly fell again to a subnormal level. Bowman, Wortis, Orenstein and Goldfarb,[8] studying the effect of glucose on the oxidation of alcohol, found depression of the glucose tolerance curve with improvement after one week's hospitalization of the alcoholic patient. Improvement was attributed to emotional factors plus a dietary regimen correcting the effects of malnutrition. Soffer[9] found that low blood sugar and depleted glycogen stores could be restored to normal by the administration of a potent cortical extract. Britton and Silvette[10] observed also that the administration of adrenal cortical extract would prevent glycogen depletion of the liver in fasting adrenalectomized rats and mice. It is our belief that through this medium of insuring sufficient amounts of adrenal cortical hormone, chronic alcoholism may be controlled.

The postulation is offered that when the blood sugar falls to a certain low level, a craving for alcohol results. This craving manifests itself in a series of symptoms similar to those of hyperinsulinism. Without the

previous association with alcohol and his knowledge that relief of these symptoms would ensue, the patient would probably resort to the ingestion of carbohydrate in some form. The consumption of alcohol produces an initial hyperglycemia[11] but eventually leads to hypoglycemia. Continued drinking further decreases the blood sugar, the liver glycogen stores become depleted, and fatty infiltration of the liver occurs. In this state the liver is unable to detoxify the estrogens and sex changes found in chronic alcoholism result, e.g., gynecomastia, loss of hair and gonadal atrophy.

The entire process is reversed by the administration of adrenal cortical hormone which mobilizes glycogen from tissue protein, increases the blood sugar and initiates a return toward normal functioning of the liver.[12] The liver again is able to detoxify the estrogens and probably the aldehydes of the alcohol. In addition to these improved physical and laboratory findings, clinical manifestations of disturbed psychic and neurologic function, epigastric distress, abdominal tenderness in the hepatic region, hepatomegaly and other signs of liver involvement occurring particularly during the acute phase of chronic alcoholism, are relieved. From these clinical and laboratory observations, together with the satisfactory therapeutic results, it seems reasonable to assume that a state of hypoadrenocorticism exists in these patients either as a latent condition or as one induced by the pathologic effects of alcohol.

THERAPEUTIC PROCEDURE

The procedure developed for the treatment of acute alcoholic states with or without associated chronic alcoholism consists in the administration intravenously of 30 cc. of adrenal cortical extract* in three divided doses during the first twenty-four hours, 20 cc. in two doses during the second twenty-four-hour period, then one single injection of 5 cc. to 10 cc. daily for three days. It has not been found necessary in our experience to give the adrenal cortical hormone more frequently than once in four hours the first day, one injection every six to eight hours sufficing usually. Hospitalization is necessary often and always desirable but one needs seldom to hospitalize even the most severe forms of acute alcoholism beyond the fifth day and a number have been treated successfully with but three days of hospitalization. Out-patient treatment is possible and frequently with good result but the patient is less well controlled, his tolerance for alcohol is increased, and without sufficient time to alter his attitudes and feelings, there is further risk of drinking. Following discharge from the hospital, 2 cc. to 5 cc. of the adrenal cortical hormone are given intramuscularly twice a week for three weeks, then at weekly intervals for an indefinite period. There is wide individual variation relative to the duration of the convalescent out-patient treatment program. Both during and following hospitalization patients are given a diet* high in fat, moderate in protein and restricted in carbohydrate to prevent sudden

†Eschatin, Parke, Davis & Co., is the adrenal cortex extract used in this study.

*Sample diet included at end of paper.

changes in the blood sugar concentration. Vitamins were given to approximately half of the patients studied but almost without exception, even when dietary deficiency had been present for a long time or where a high degree of alcoholic neuritis existed, the results of treatment with adrenal cortical extract were the same. Some patients with peripheral neuritis appeared to do better with the extract after vitamin B had been discontinued.

SEDATION is usually unnecessary because with the first injection of adrenal cortical extract the patient experiences a pleasant sensation of warmth and relaxation. This is of tremendous psychological significance because of the great tendency of alcoholic patients to either substitute sedatives for or combine them with alcohol. Persistent anorexia, when it occurs, may be controlled with daily subcutaneous injections of 10 to 15 units of protamine-zinc insulin. When signs of testicular atrophy or feminizing symptoms are evident, testosterone propionate may be administered concomitantly with the adrenal cortical hormone. Likewise testosterone with or without estrogens may be indicated in certain of the female patients, particularly those in the fourth and fifth decades of life with menopausal symptoms. To complete the psychobiologic approach to successful treatment of alcoholism, arrangements are made for each patient to be interviewed by successful members of Alcoholics Anonymous and he is urged to identify himself actively with the complete program of this excellent body. Specialized psychiatric therapy is reserved for the relatively small group of alcoholic patients suffering major psychopathological disorders.

CASE REPORTS

The first two are typical case reports of seriously ill hospitalized patients; the third is that of a successfully treated out-patient.

Case 1: J.P., a 41-year-old male, was admitted to the hospital with a history of chronic alcoholism for eleven years during which time there were several unsuccessful attempts to cure himself. Shortly before admission he developed abdominal distress, anorexia, nausea, vomiting and diarrhea. There were marked nervousness, tremors, nightmares and visual images of people and animals. Several bolstering drinks were needed to start the day and ameliorate his extreme nervousness, apprehension and excessive perspiration. The liver was tender and palpable three fingers' breadth below the costal margin. Blood pressure was 160/94. Blood sugar determination upon admission was 74 mg. per 100 cc. Blood count: hemoglobin, 103 per cent; red blood count, 4,800,000; white blood count, 8,400. Differential count: polymorphonuclear neutrophiles, 50 per cent; lymphocytes, 45 per cent; monocytes, 3 per cent; eosinophiles, 2 per cent. Urinalysis: albumin, trace; sugar, negative. The 17 ketosteroids and androgens were low (7 mg. and 12 international units, respectively).

Treatment was started immediately with 10 cc. of adrenal cortical extract and thirty minutes later a blood sugar determination revealed 100 mg. per

100 cc. Following this single injection, patient lost completely his craving for more alcohol. The abdominal pain was lessened considerably and disappeared completely eight hours later after the second injection. He slept without sedation and without nightmares for the first time in eleven years. The following morning he felt so well that he asked to go home. His jitters, apprehensions, colliquative sweating, and tremors which are prominent and distressing symptoms the first day of abstinence usually, were gone. His condition was excellent on the fifth day when a glucose tolerance test was made with these results:

	Time	Blood Sugar	Urine
Fasting	8:50 A.M.	80 mg. per 100 cc.	Negative
First specimen	9:30 A.M.	160 mg. per 100 cc.	Trace
Second specimen	10:30 A.M.	117 mg. per 100 cc.	3 plus
Third specimen	11:30 A.M.	52 mg. per 100 cc.	2 plus
Fourth specimen	12:30 P.M.	71 mg. per 100 cc.	Negative

Patient felt entirely well until the third hour test when the blood sugar dropped precipitously to 52 mg. per 100 cc. He then had severe tremors which subsided following another injection of the adrenal cortical hormone. After his discharge from the hospital on the fifth day he was treated as an out-patient receiving 4 cc. of adrenal cortical extract and 25 mg. of testosterone propionate twice weekly for three weeks, then once weekly for four months. Fourteen months have passed without any compulsion to drink and all of the admitting symptoms have disappeared. There has been a remarkably improved personality change with recovery.

Case 2: W. C., a 43-year-old white male, was admitted to the hospital with a history of twenty years of chronic alcoholism. His tolerance for alcohol had decreased markedly during the previous year and this was his eighth hospitalization within a six months' period. Two days prior to admission he had been given six ounces of elixir allurate at another hospital, other barbiturates and intramuscular paraldehyde without producing sleep. He had complained of almost constant epigastric pain for the past two years. Gastrointestinal x-ray studies were reported as negative. Admission laboratory findings showed hypoglycemia, low 17-ketosteroids and androgens, a relative lymphocytosis and slight albuminuria.

Patient fell into a profound sleep shortly after receiving his first 10 cc. injection of adrenal cortical extract intravenously. A total of 30 cc. of the extract was injected in divided doses the first day, 20 cc. the second, and 10 cc. each day thereafter until he had received 100 cc. in all. The epigastric pain had subsided considerably by the third day and had cleared entirely at the time of his discharge on the eighth day. Out-patient therapy consisted of 5 cc. adrenal cortical extract injections intramuscularly twice weekly for three weeks, then once weekly for nine months. Recovery appears to have been complete.

CASE 3: P. H., a white male attorney, aged 34 years, was seen as an outpatient in a marked state of acute alcoholic intoxication. His own desperate efforts to stop his steady drinking bout of three weeks were in vain. During the final week he could not tolerate any food. He had been chronically alcoholic for ten years. Examination of the blood revealed hypoglycemia (60 mg. per 100 cc.). Urinalysis showed a trace of albumin. The 17-ketosteroids were low (5 mg.) as were the androgens (10 international units). Patient was treated in the usual manner. His appetite returned the second day and his desire to drink was lost. On the third day he was permitted to return to work. He did well for two weeks but became acutely depressed the third week and experienced an intense craving for alcohol. The intravenous route was again resorted to with prompt relief of symptoms and up to the present time, eleven months later, patient has enjoyed sobriety and serenity.

In each instance above, the patients either had been identified with Alcoholics Anonymous or became so upon our recommendation. The suggested diet plan, modified only to meet individual tastes or idiosyncrasies, was adhered to closely. Although the laboratory findings did not always return completely to normal, there was significant improvement in almost every patient.

CONCLUSION

A TREATMENT for alcoholism has been devised by which the torturing drying-out period is practically eliminated and the recurrent craving for alcohol considerably lessened. The endocrine approach to this treatment is well founded in experimental studies with adrenal cortical extract and fully justified by clinical results observed in patients to whom applied. Treatment is based upon the need to correct either a constitutional or acquired state of hypoadrenocorticism which is intimately associated with the allergy-like character of alcoholism. Therapy is relatively simple, nontoxic and entirely safe in the hands of any competent physician. Sedation is seldom needed. Long periods of hospitalization are unnecessary. Vitamins appear to be of little or no importance. Insulin, androgen with or without estrogen, and a diet high in fat, moderate in protein and low in carbohydrate may be useful adjuncts to treatment. Specialized psychotherapeutic procedures become less important than heretofore considered in the management of the alcoholic patient who, however, is advised to identify himself with Alcoholics Anonymous. Further studies are needed for the investigation of the role not only of the adrenals but of the other endocrine structures as well.

SAMPLE DIET DURING TREATMENT*

Breakfast:

½ cup oatmeal with milk and cream.
2 slices of ham and 2 eggs.
1 medium pat of butter.
1 glass of warm milk.

*See reference page 276.

10:00 A.M.

½ cup orange juice or 1 small peach or 2/3 cup of strawberries or pineapple, or 1 glass of milk.

12:30 P.M.

½ cup rhubarb or spinach or 1 tomato or 2 cups watercress or 1/3 head of lettuce.

½ cup of carrots or beets or peas or turnips.

1 peach or 2/3 cup of strawberries or pineapple.

3 ozs. of moderately fat meat.

1 large pat of butter.

1 glass of warm milk.

3:30 P.M.

1 glass of milk.

6:00 P.M.

½ cup of rhubarb or spinach, or 1 tomato or 2 cups of watercress. Cream of pea, asparagus or tomato soup.

1/3 head of lettuce or 1 tomato or 2 cups of celery. This should be taken with mayonnaise.

3 ozs. of meat.

1 pat of butter.

Bedtime:

1 glass of milk.

Candies, cola drinks, or other soft drinks absolutely forbidden.

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Old Age*

Trevor Howell, M.R.C.P., ED.†

THIS is a subject which has interested men, and especially medical men, for a great number of years. There is reference to rejuvenation in the Edwin Smith Surgical Papyrus from ancient Egypt. Some of the most profound remarks on old age were made by Hippocrates, when he said "Old men suffer from difficulty of breathing, catarrh accompanied by coughing, strangury, difficult micturition, pains at the joints, kidney disease, dizziness, apoplexy, cachexia, pruritus of the whole body, sleeplessness, watery discharges from the bowels, eyes and nostrils, dullness of sight, cataract, hardness of hearing." Aristotle studied the mental changes of senescence, giving an excellent description of them in the 13th chapter of his second book on Rhetoric. Cicero's work *De senectute* is well known and often quoted. After Roman times, however, interest in the duration of life tended to become less, owing to disease and frequent wars. Only Roger Bacon, in the thirteenth century, wrote anything on old age. After the Renaissance, there was increased consideration of the prolongation of life, due to Cornaro, whose book has had dozens of imitators up to the present day. Most of these have some theory of their own to put forward, usually with very little evidence to support it. Cohausen vaunts the breath of virgins as a potent means of remaining young. Cheyne and others preach exercise and temperance. More recently Lorand suggested that a thyroid deficiency caused old age. Metchnikoff talked of autointoxication and recommended ingestion of the (lactic acid) bacillus bulgaricus. Bogolometz blames the reticulo-endothelial system and Korenchevsky implicates the whole of the endocrine orchestra. Such varied opinions must make the philosopher Descartes turn in his grave—for he first advocated research into old age.

These theories, however, do not help us in our daily task of diagnosis and treatment. They make me think of the celebrated words of Sherlock Holmes, "I have no data yet. It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts." May I therefore offer you a few facts which I have observed about old age? First let us consider one or two points in anatomy and physiology (Figure 1).

ARTERIES

You are all familiar with the dictum of Cazalet—"A man is as old as his arteries." When I examined 341 healthy Chelsea pensioners during the war, I found that there were five different types of artery in old men. Sixteen per cent had no obvious thickening present. The oldest in

*Paper presented at the Medical Society of London.

†Physician, Geriatric Unit, St. John's Hospital, Battersea, London.

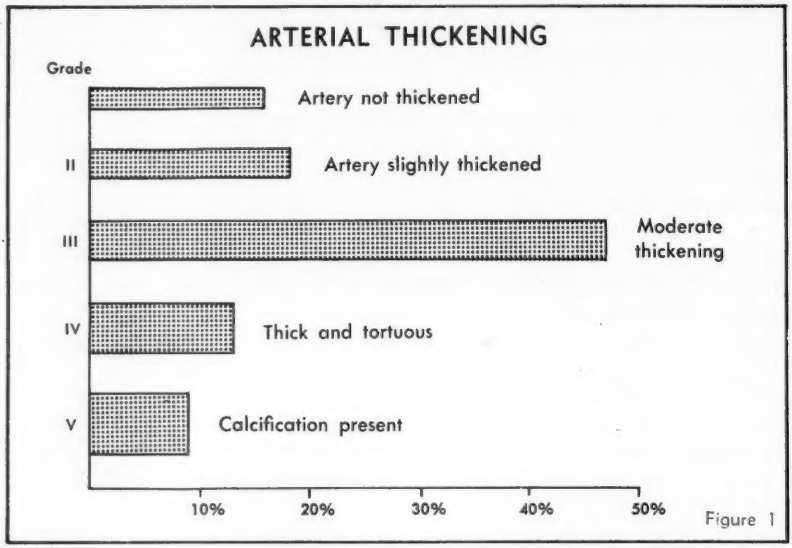

Figure 1

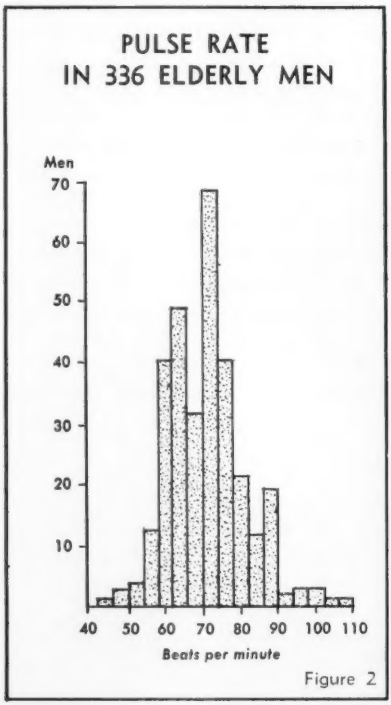

Figure 2

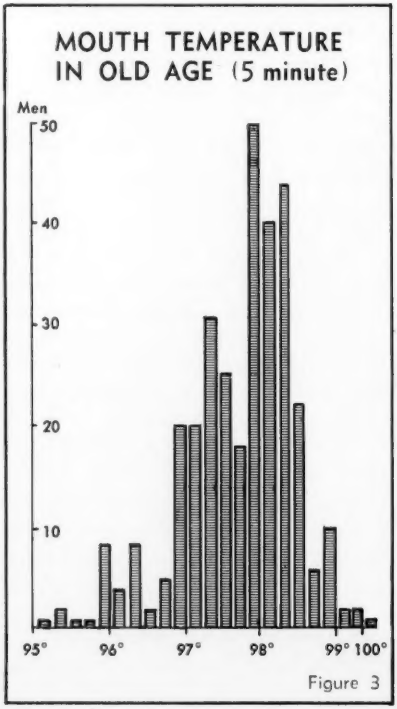

Figure 3

this group was 84 years of age, most of the men being relatively young and active. The second type showed slight thickening, and was present in 18 per cent, with an average age slightly higher than the former group. Some 46 per cent had moderate thickening, but no tortuosity nor calcification. This was unusual under the age of 65. Thirteen per cent had tortuous arteries which were not calcified, while eight per cent had marked calcification. Some pensioners who had been under observation for several years had developed more thickening, tortuosity and calcification during that time. The really characteristic point, however, was the great variation of findings in all the age groups over 65. This wide range of normality is one regular pattern which has been repeated again and again in different investigations.

BLOOD PRESSURE

When the blood pressure of these men was measured, a high systolic figure and a large pulse pressure were the common discoveries. Some 75

TABLE I

BLOOD PRESSURE IN OLD AGE

Age	Systolic Over 16 mm. Percentage	Systolic Over 200 mm. Percentage	Men
55-65	28	7	14
65-75	68	21	183
75-85	84	29	121
85-95	95	50	23
All ages	77	25	341

per cent had systolic readings above 160 mm. Hg., and the proportion tended to rise with age. This was also true of those whose systolic figures were over 200 mm., which included 25 per cent of all the men examined. During the last years of life, when infirmity overtook these pensioners, their blood pressure fell and the figures for patients in the infirmary was lower than those of the active healthy men (Figure 2).

PULSE RATE

When the pulse rate was counted in the healthy pensioners, it was found to vary from 44 to 110 beats per minute. Between the ages of sixty and eighty-five, the mean for the five-year age groups fell steadily from 75.6 to 69.1 per minute, but after this age they tended to rise again. While the average of the whole series was 72 beats, it was the wide variation in active healthy old men which was so striking.

TEMPERATURE

An unusual range was also present when the temperature was taken (Figure 3). The figures in the mouth ranged from 95.2° to 100.2° after

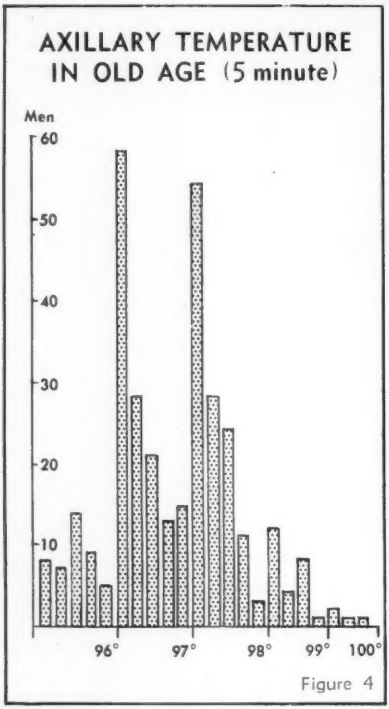

Figure 4

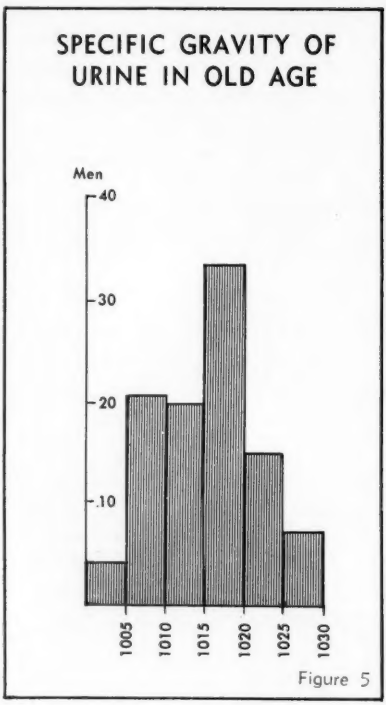

Figure 5

leaving the thermometer in place for five minutes. In the axilla, the lowest temperature was 95° and the highest 99.4°. There was a slight general tendency for the older pensioners to show lower readings than the younger ones (Figure 4). A control series of young persons had a narrower range and somewhat higher temperatures.

URINE

When the specific gravity of the urine of 100 pensioners was measured in the early morning specimen, the mean figure was 1016.8 (Figure 5). The range was again wide, from 1030 to 1005. *Blood urea* in 103 old people of both sexes varied from 15 to 58 mgm. per cent, with an average of 36.9 mgm. There was no regular rise with advancing years (Figure 6).

KIDNEYS

In a series of kidneys from old people examined at post mortem, nearly half were normal to naked eye. The commonest abnormality was a finely granular surface, with narrowed cortex, excessive pelvic fat and thickened

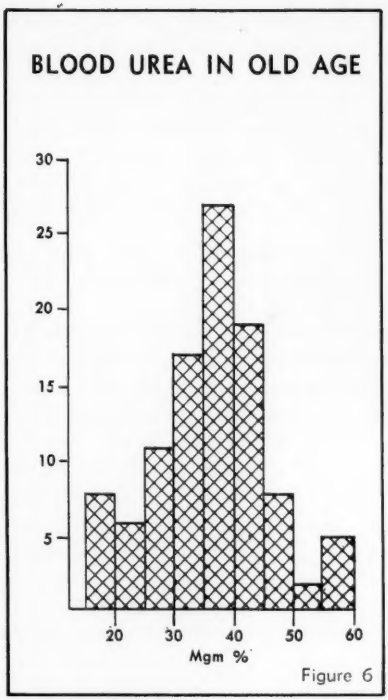

Figure 6

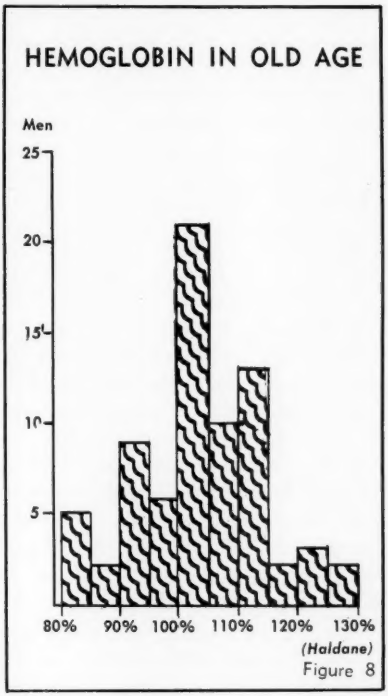

Figure 8

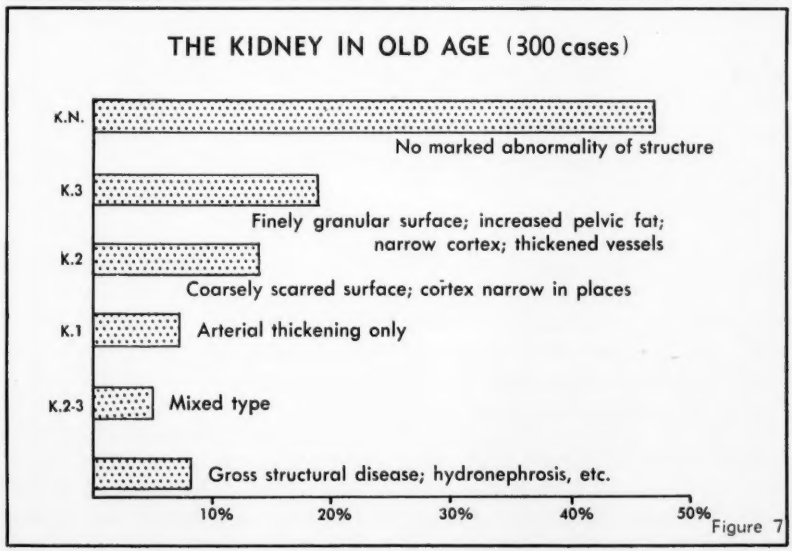

Figure 7

blood vessels, which accounted for 20 per cent (Figure 7). A coarsely scarred kidney with patchy narrowing of the cortex was found in 15 per cent, while arterial changes only were present in 7 per cent of the total. Gross renal disease causing death was only present in 8 per cent of the series. When histological sections were examined, it was usual to find that most of the glomeruli appeared normal. The microscopical appearance bore no relationship to the age of the subject. These findings agree with the view of Nathan Shock that the tubules are the part of the kidney which first shows functional failure in the aged.

HAEMOGLOBIN

Some of the older writers have suggested that elderly people are normally anaemic. My own findings do not agree with this. A series of blood counts and haemoglobin estimations performed on elderly subjects showed values which were high rather than low. In fact, I doubted my own figures until a confirmatory series was done by another worker using a different method. The range for males was from 80 per cent to 130 per cent for haemoglobin using the Sahli method, and from 4 million to 7 million per cubic cm. for the red cells (Figure 8). The variations in the haemoglobin level for females were 75 per cent to 130 per cent, with an average of 96 per cent, which was some ten per cent lower than the men. There was no relationship between age and blood count in this series. The bone marrow of most aged subjects looks a good red color when inspected at post-mortem. Only a few cases show gelatinous changes.

CENTRAL NERVOUS SYSTEM

When we turn to the physiology of the central nervous system in old age, we again meet a wide variety of findings in the healthy subject. The

TABLE II

NEUROLOGICAL FINDINGS IN 200 PENSIONERS

	Percentage
Pupils react to light	54
Pupils react to accommodation	41
Ankle jerk present	30
Knee jerk present	77
Biceps jerk present	86
Abdominal reflexes present	50
Vibration sense: Sacrum 15%, Knees 54%, Ankles 77%	
Dysmetria: Right hand 8%, Left hand 15%, Both 20%	

pupils fail to react both to light and to accommodation more frequently as the years increase. Reflexes are more difficult to elicit as the person grows older. It seems more laborious to rotate the forearms at eighty than it was at sixty. Yet power may be well preserved up to the ninth decade in a few.

There is a tendency to dysmetria in many old people, but this is as common at sixty-five as it is at eighty-five. Patches of anaesthesia on the shins and forearms may be found in some old folk; but this bears no relationship to age. Vibration is often poorly registered below the waist, but normal in the upper limbs. Such clinical findings need great care in their interpretation and may lead the unwary astray.

ORGANS

The anatomical changes of old age have, as yet, been little studied. Wartin suggests that the most reliable test of age is the presence of hypoplasia or atrophy of organs. But my own experience makes me doubt this dictum. In a series of post-mortems on patients between the ages of 66 and 99, organs smaller than normal were only present in about a quarter of the total. In the case of the liver, even apparently atrophied organs did not reveal any gross change in structure under the microscope. The heart was similarly disappointing, often failing to show even an increase of pigment. Spleens likewise disclosed little, apart from capsular changes, so that it was not possible to see any clear difference between the organ of a patient aged sixty and one aged ninety. The pancreas was another structure which altered little with the passage of years. These matters, however, are still under investigation and the final verdict remains to be given at a later date. At the moment there seem few changes which can be ascribed to old age and to that alone.

IT SOMETIMES appears to me that clinically there are two, or perhaps three, groups of old people. I am acquainted with one type which presents manifestations of advanced senility in body and mind during the sixties. There is another group which seems well preserved even in the eighties. It is interesting to recall in this connection that some of my physiological investigations among the aged have shown a double peak when expressed graphically. I wonder if there is any significance in this association?

MORBID ANATOMY

Having touched on one or two points in the map of normal old age, let us pass on to glance into the atlas of the abnormal. It is tempting to discuss clinical medicine and surgery as they appear among the elderly. Yet this terrain is partly unexplored and has not yet been surveyed at all scientifically. Since I am anxious to present you with verified facts, the most satisfactory province to traverse is that of morbid anatomy. There are those who quibble about a definition of old age. So, to meet their objections, I have ventured to present to you the analysis of 240 post-mortem examinations on patients aged 80 or over, from a large general hospital in London. All these examinations were performed by the same morbid anatomist, who is my collaborator in research on old age.

CANCER

I have heard varying opinions about the frequency of new growths in the later decades of life (Figure 9). In the series under review some 25 per cent possessed a neoplasm of malignant type. Three cases had two separate growths in different parts of the body. In three more instances the neoplasm was not the primary cause of death. The commonest site of cancer was the large intestine, then came the stomach, pancreas, aesophagus, bronchus and bladder. Other tissues showing primary malignant changes were breast, small intestine, bile ducts, peritoneum, pleura, prostate, uterus, ovary, brain and larynx. The oldest case in the series (aged 93) died with a carcinoma of the caecum. By reason of selection no patient with a new growth of mouth or face came to the morbid anatomist. This excluded what had proved the commonest site of cancer in a series of Chelsea pensioners which I had collected from the records of the Royal Hospital. Otherwise the two lists were in general agreement. It should be noted that the diagnosis of the present cases had normally been confirmed histologically, while the Chelsea list had not been thus checked as a rule.

CARDIO-VASCULAR DEGENERATION

The system in which pathological changes were most often found was, of course, the cardio-vascular tree (Figure 10). A special note had been made of the state of the aorta in 200 of the cases. Considerable atheroma with some calcification, usually towards the lower part of the abdominal aorta was present in 69 per cent. A moderate degree, without obvious calcification was found in 26 per cent, while in 5 per cent only scattered patches of atheroma were seen. In 110 cases a detailed description of the condition of the coronary arteries had been made. Here, 62 per cent showed atheroma and calcification, while 35 per cent had moderate atheroma only and 3 per cent would have been normal in a young man.

THE MYOCARDIUM sometimes showed the presence of fibrous tissue, either in streaks or as patches of fibrosis. In other cases the muscle was soft and friable, breaking and shredding easily. A few hearts seemed greasy or fatty to the touch. At times the wall of the right ventricle consisted mainly of fat, with only a little muscle present. This has been confirmed histologically. When changes like these seemed to be the cause of death, the label "myocardial degeneration" was employed. This accounted for some 8 per cent of cases. If the arterial changes were more pronounced than the cardiac ones, the label "Cardio-vascular degeneration" was used. This type of case was found in 20 per cent of the total. Coronary thrombosis occurred in only 3 per cent, while mitral stenosis was the fatal lesion in 1.5 per cent. Other vascular accidents included mesenteric thrombosis, mesenteric embolism, ruptured aneurism and dissecting aneurism. Altogether 36 per cent of the series died from a lesion in the cardio-vascular system.

The digestive organs only accounted for 14 per cent of these deaths.

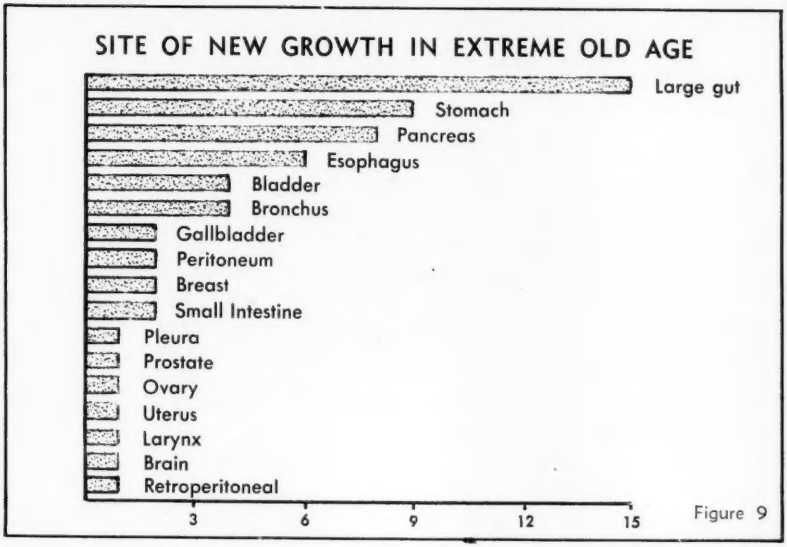

Figure 9

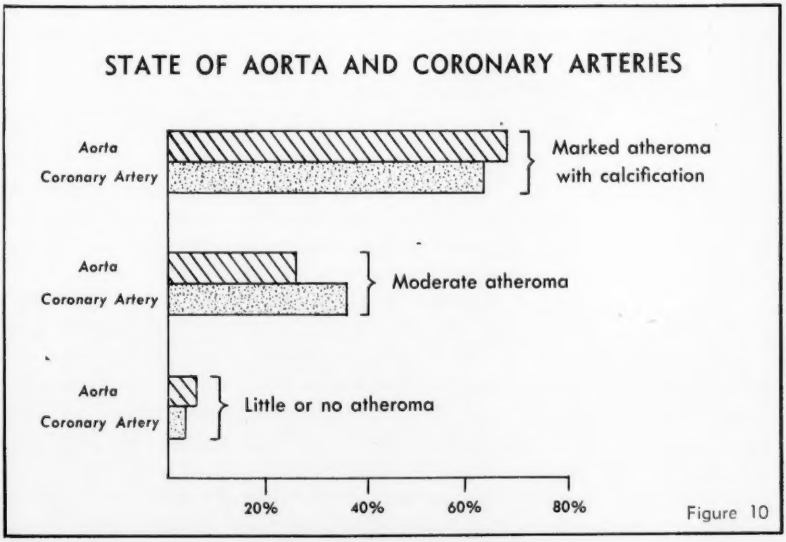

Figure 10

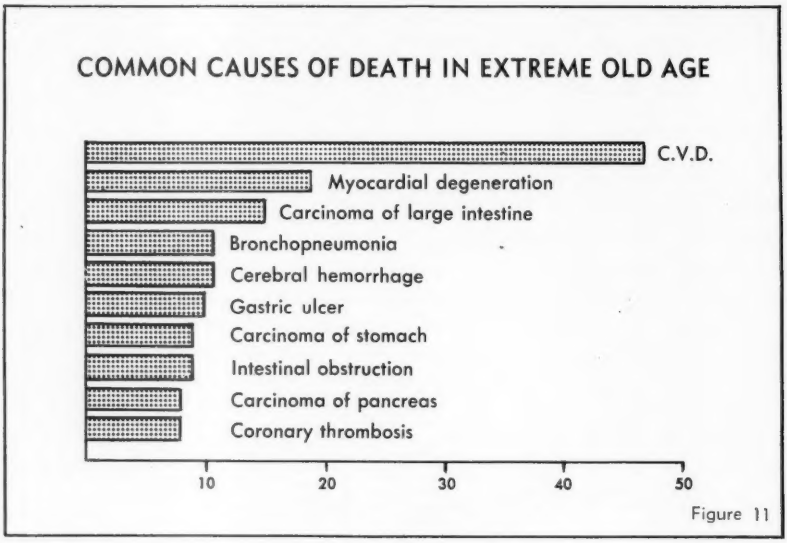

Figure 11

(Figure 11). The commonest lesion was a gastric ulcer, which had either bled or perforated. Intestinal obstruction for some reason was not uncommon, nor were diverticulitis and cholecystitis. The kidney was only rarely the site of a fatal lesion, and such a lesion was invariably either a pyonephrosis or a pyelonephritis. No case of true chronic nephritis was encountered, although various forms of arteriosclerotic kidney were common. Incidentally, it has been noted that atheroma of the renal artery is most unusual among elderly subjects. The statement "artery normal" recurs time and again among our records of morbid anatomy.

The lesions of the central nervous system which caused death were first and foremost cerebral haemorrhage, then cerebral thrombosis a good way after. Other diseases did not occur.

The respiratory system was another in which a few diseases only were fatal. Out of the total number, half were broncho-pneumonia, a quarter chronic bronchitis and nearly all the rest lobar pneumonia. Lesion in this system made up 10 per cent of the total causes of death.

It must be reiterated that this series of cases is taken from the post-mortem records of a general hospital. It differs in some respects from a similar series which I am collecting in a "chronic" hospital, as there are many more cases of sudden or acute illness. It also differs in some ways from the list of diagnoses in death certificates of patients who have not come to post-mortem. These causes of death do not represent the total pathology of old age. It is my practice at the moment, for purposes of research, to cross-index all post-mortem findings under some 30 separate headings. Looking through a number of cards, I see few which do not require twelve

or fifteen entries to be made. In the series which I have analysed for discussion, only two cases showed less than three pathological lesions, while most of the subjects had six or seven separate morbid processes revealed by dissection. Perhaps I may be allowed to express this another way. When I was a student, my teachers insisted upon the need to embrace all the signs and symptoms of a case within one diagnosis. Dealing with elderly patients this is usually impossible. There are often two, three or even four separate conditions diagnosed during life. When the case comes to autopsy, we often discover one or more unsuspected lesions in addition. I have not time to discuss all these secondary, non-fatal processes and can only enumerate a few of them. The commonest are probably atheroma of the aorta, emphysema, or perhaps an arteriosclerotic kidney. Gastric or duodenal ulcers are often present, signs of old pulmonary tuberculosis are not unusual. Diverticulosis of the sigmoid occurs from time to time, as does enlargement of the prostate in men. Chronic bronchitis is less common than expected, as are gallstones. Minor cardiovascular lesions are so frequent, however, as to be expected in almost every case.

NOW, WHEN we try to summarize the findings which I have outlined, there are one or two outstanding impressions. The first of these is the wide range of normal findings for various functions in the healthy old people. These are particularly marked in the temperature, pulse rate, blood count and renal efficiency. Secondly, there is the great variety of morbid processes found at autopsy. If, as Cowper says, "Variety's the very spice of life," it is also the very essence of old age. It makes me doubt whether any one single agent could be responsible for all the changes which I have encountered.

The next impression made on the mind, is one of multiple pathology, with a preponderance of cardiovascular degeneration. Every year of life gives a chance for some new disease process to start, or some old one to continue. Certain tissues, such as those of the intestine, seem to favor new growths; others, such as the arteries, prefer degeneration or calcification. Are these examples of one single pathological trend or are they two separate agencies working unconnected? In spite of the tendency of Russian scientists to ascribe everything in old age to some unitary cause, whether it be endocrine imbalance, failure of the reticulo-endothelial system or autointoxication, I feel that the facts are against them. One might as well say that all motor cars wear out because the transmission is faulty!

Finally, I must raise the question whether old age has any diseases of its own. Judging by morbid anatomy, these are very few, apart from enlargement of the prostate and one or two conditions of the ear and the eye. On the other hand, if we consider morbid physiology, or clinical medicine and surgery, I think that the reaction of the aged to disease is not the same as that of the young. Such problems as the contractures of joints and progressive cerebral ischaemia are classic examples of these special difficulties met chiefly in the elderly. With the age of our population steadily increasing, it

is time that the disorders of later life received more attention from our profession. Physiologists and clinical research workers will find a number of fascinating problems awaiting their notice. Both physicians and surgeons have here a field which gives an opportunity for the exercise of all their talents, in the highest degree. As one who works in hospitals full of elderly patients, may I invite them to "Come over into Macedonia and help us?"

Factors Affecting Aging

Franz J. Kallman, M.D., *and Gerhard Sander,* PH.D.*

VARIOUS CHANGES, both subtle and straightforward, herald the onset and characterize the development of senescence in man. All human beings as they grow older become subject to these senile manifestations. However, the time of life at which a person appears aged may vary considerably. Also, the manner in which senescence develops is anything but constant.

Franz J. Kallman, M.D., and Gerhard Sander, Ph.D., are convinced that heredity and constitution are of fundamental importance in determining at what age and in what manner a person will become old.

A study of 1,602 elderly twins reveals marked differences between monozygotic and dizygotic twins. One-egg twin partners display a genetically determined likeness of physique and personality which tends to persist throughout life to an advanced age. In addition, the time and method of appearance of aging are remarkably similar in monozygotic twins. This holds true despite extreme differences of occupation and environment. Intellectual deterioration begins at nearly the same age and progresses in a like manner for both twins of a single ovum. In some cases the similarity applies even to roentgen and electrocardiographic features.

One-egg twins tend to have the same life span. Both partners may die of the same cause within a few days of one another.

Twins from separate ova (dizygotic), on the other hand, fail to display a likeness of either physical or mental attributes. Nor do they grow old with the same degree of similarity so characteristic of one-egg twins. The length of life of dizygotic twins also varies between partners.

Dizygotic twins are more apt to marry and have children than are the members of a one-egg twin pair, especially male monozygotic twins. The difference is probably psychological rather than biological since the wives of one-egg twins often find it difficult to overcome the close relationship that exists between their husbands.

There is no reason to believe that a person derived from one-half of an ovum (monozygotic) is inferior physically or mentally to either a two-egg twin or a single-born person.

*Twin studies on senescence. Am. J. Psych. 106:29-36, July, 1949.

A New Skin Treatment for the Incontinent Patient

A Preliminary Report

George Nagamatsu, M. D.,*
Thomas Johnson, M. D.,* *and Martin E. Silverstein* M. D.*

IT IS THE purpose of this paper to present a method for the treatment of one of the underlying causes of skin excoriation. This factor is the prolonged contact of the skin and urine.

The problem of urinary excoriation is seen in two major groups of patients. The first group are post-operative patients who have been subjected to genito-urinary surgery such that their operative wounds drain urine. These cases vary from sinuses which close in a matter of days to permanent ureterostomies. The second, and much larger group, subjected to prolonged contact with urine, are incontinent persons. These may be classified etiologically into (1) the physiological incontinence of infancy, (2) the post-operative patient suffering from damage to the external sphincter of the bladder, (3) the neurological and neurosurgical patient suffering from primary pathology of the central nervous system, and (4) the senile incontinent.

FACTORS IN SKIN EXCORIATION

The principal difficulty in treatment of ulceration of the skin in these patients is the multiplicity of the etiological factors. Those contributing factors that we have found and others have reported to be of significance are:

(1) Pressure against the skin over a bony prominence.
(2) Poor arterial circulation.
(3) The loss of normal neuro-vascular skin reflexes.
(4) The general nutrition of the patient, and particularly protein nutrition.
(5) The presence of debilitating systemic disease.
(6) The almost inevitable secondary infection which occurs when the epidermis is excoriated for a considerable length of time.
(7) The macerating effect of continuous bathing of an area with fluid.
(8) The irritating effects of ammonia produced by the action of urinary organisms on the nitrogen containing components of urine.

THE THERAPY OF EXCORIATION

It has repeatedly been pointed out that successful prophylaxis in therapy of skin ulceration requires measures directed toward each contributing factor.

*From the New York Medical College, Department of Urology, Metropolitan Hospital Unit.

As each etiological factor has been discovered counter measures have been instituted. The use of frequent changes of position, and the rubber mattress and ring is mentioned in most textbooks of surgery.[1] Munro[2] has stressed the loss of skin neuro-vascular reflexes in paraplegic patients, the group probably most subject to skin ulceration. Massage, passive movement, and local protection against pressure irritants, are essential when this condition exists. That the general nutrition of the patient is an important factor was amply demonstrated by Mulholland and his co-workers,[3] who demonstrated good results from the feeding of a high protein diet reinforced by protein hydrolysates. Supplementary protein feedings are particularly important in patients suffering from chronic debilitating diseases such as tuberculosis. Such patients require forced feedings of high calorie, high vitamin, high protein diets.[4] The management of local infection of ulcers has always been difficult. Painting with some of the dye antiseptics is used by some. Wet dressings with azochloramide is advocated as an antiseptic, and to effect a debridement of the area.[5] Sulfonamide and penicillin ointments, wet tyrothricin dressings, and Furacin ointment are used with varying degrees of success. Patients may be protected against the macerating effect of fluid by frequent changes of dressing and local application of some such protective ointment as aluminum paste. Where nursing care is short, and when the area in contact with the fluid is extensive, these measures fall short of success.

The problem of protection against the irritating effects of ammonia as produced by the action of bacteria from fecal, urinary, and external environmental sources has been a factor unsuccessfully dealt with thus far. It is the prophylaxis and therapy of this factor with which we have been concerned.

METHODS OF PREVENTION OF URINARY EXCORIATION

We may, in general, outline three measures in the prevention of excoriation due to prolonged contact of skin surface and urine. These are (1) diversion of the urinary stream, (2) interposition of a protective layer for the skin, and (3) frequent changes of dressings.

1. *Diversion of the urinary stream.* The general method used is to divert the urine from the skin through a catheter and into a receptacle. The urethral catheter and nephrostomy, pyelotomy and ureterostomy tubes fall into this category. Urinary diversion of the midtract is attempted by the cystotomy tube, by suction drainage, and devices which attempt to trap urine within a small area to which surface suction can be applied. Diversion of urine from the lower tract is usually accomplished by the indwelling catheter and devices such as the penile bag and clamp.

While absolute urinary diversion would solve the problem of prevention of excoriation, this is not accomplished by the methods discussed above. The disadvantages of diversionary methods are:

a. *Leakage*—usually there is leakage around the tube at the orifice. Obstruction within the tube often occurs and aggravates such leakage.

b. *Infection*—this is the most important single objection. Indwelling tubes, if left in long enough, almost invariably lead to infection. Tidal drainage provides some protection against infection in the presence of an indwelling urethral catheter but is an elaborate apparatus applicable only to a limited group of patients, although adequate in many cases.

c. *Disadvantages of penile bags and clamps*—Bags allow for a continuous drip at the urethral meatus, and we have found several cases of severe excoriation of the glans in patients using these bags. Penile clamps present few objections in intelligent, self-sufficient patients. They are of little use in neurological patients with impaired bladder sensation, and some patients find the clamp so uncomfortable as to be intolerable.

A special method of urinary diversion, against which none of the above objections are valid, consists of diversion into the large bowel by ureterosigmoid anastomosis. This is, of course, of very limited applicability.[6]

2. *Prevention of urinary contact by interposition of a protective layer.* This is accomplished, usually, by the use of an inert protective ointment such as aluminum paste or petroleum jelly, or by rubber sheeting or cellophane. Sheeting is very hard to keep in place, and to seal at the orifice. The trapping of fluid between the skin and a nonporous dressing results in the worst type of excoriation. Ointments are successful in protecting a limited area, but in incontinents the area to be protected is so large and variable, as to make them impracticable.

3. *Frequent dressings.* Where urine soaked dressings can be immediately removed, and the affected area cleaned and dried, there is no problem of excoriation. However, to carry out this regime is usually impracticable.

PATHOGENESIS OF URINARY EXCORIATION

A situation in which the presence of urine is the dominant, and probably the exclusive etiology of skin excoriation, is in the production of diaper rash in infants. Cooke[7] has shown that when an organism, Bacillus ammoniagenes, found in feces, was provided with an environment of urine, ammonia was produced and a rash resulted. Cooke found that a rinse of 1:4000 bichloride of mercury for infants' diapers inhibited growth of this organism and prevented diaper rash.

We have found that in incontinent adults on urologic and neurologic wards, the same combination of fecal soiling and urine soaked environment leads to a sequence of cutaneous hyperemia, vesiculation, erosion, and finally deep ulceration.

The skin of the abdominal wall surrounding cystotomy wounds provides an area for the study of the effects of urine on skin in the absence of fecal contamination. This situation, seen almost exclusively in the urologic patient, provides an environment in which the interaction of urine, skin, and the

therapeutic agent can be observed under controlled conditions. Here again in the untreated patient we observe the identical sequence of cutaneous pathology. Urinary culture always revealed the presence of ammonia splitting organisms within the urine itself.

Following Cooke's suggestion it was felt that an environment could be established in the presence of urine in which the incriminated bacteria would be inhibited and ammonia production diminished. Benson, Slobody, Lillick, Maffia, and Sullivan[8] studied the affect of one of the quarternary ammonium compounds, para di-isobutyl-cresoxy-ethoxy-ethyl dimethyl benzyl ammonium chloride monohydrate (as Diaparene*) on Bacillus ammoniagenes in vitro, and found it effective at room temperature in a concentration of 1:180,000.

These investigators applied wet patch tests of a 1:5,000 solution of this compound to the skin of 180 children without producing any skin irritation. one hundred of these children received a second test in ten days, and again no signs of irritation or sensitivity were found. These same investigators found that diapers rinsed in a 1:25,000 solution were inhibitory in vitro to growths of Staphlococcus aureus and Bacillus ammoniagenes. It was our feeling that should this compound be equally effective against all the ammonia producing organisms, the use of dressings impregnated with it, over areas contaminated by urine, would be equally effective in the inhibition of such bacteria and the production of ammonia excoriation.

PHARMACOLOGY AND BACTERIOLOGY OF THESE QUARTERNARY AMMONIUM COMPOUNDS

These quarternary ammonia salts have a high bactericidal activity and low toxicity to warm blooded animals. The general physical, pharmacological, and bacteriological properties are as follows:

1. *Wide bacteriological spectrum*: If the use of these quarternary compounds is to be effective as a substance preventing the formation of free ammonia by urea splitting organisms, their activity must be wide enough to include all urea splitters found in the urine and feces. One of these, Diaparene, has been found effective against all urea splitting organisms, in addition to practically all other bacteria tested.

2. *Bactericidal activity at high dilution*: They are effective at very high dilutions, making possible a wide therapeutic index. Sensitivity of different organisms show wide variations, but even the most resistant of urinary organisms, namely Proteus vulgaris and Pseudomonas pyocyaneus are destroyed in dilutions of 1:8000. The sensitivity of other organisms ranges from this relatively low dilution to bactericidal activity at extremely high dilutions of over 1:1,000,000 for certain strains of urinary invasive hemolytic streptococcus. The following table demonstrates the activity of this

*The Diaparene tablets and ointment were supplied by the Pharmaceutical Division of Homemakers' Products Corporation, New York City.

quarternary against some of the more common urea splitting organisms found in infected urine. The bacteriostatic titer was determined in broth at 37°C for 48 hours, and the bactericidal activity determined by subculturing broth at the end of 48 hours under the same temperature conditions:

Organism	*Dilutions* *Bacteriostatic*	*Bactericidal*
Proteus vulgaris	1:10,000	1:8,000
Streptococcus fecalis	1:150,000	1:150,000
Pseudomonas pyocyaneus	1:10,000	1:8,000
Alcaligines fecalis	1:40,000	1:10,000
Aerobacter aerogenes	1:40,000	1:40,000
Streptococcus viridans	1:150,000	1:150,000

These studies of bactericidal titers were necessary for clinical application. As will be seen later, a concentration of 1:5000 proved very effective, although a much greater concentration may be used and still remain well within the therapeutic index.

3. *Effectiveness at body temperature*: Studies of immediate bactericidal activity at various temperatures indicate increasing efficiency with temperature rise as indicated by the following chart:

Organism	*Dilution of Diaparene Bactericidal Within 5 Minutes* *At 20° C.*	*At 37° C.*
Escherichia coli	1:12,000	1:15,000
Staphylococcus aureus	1:25,000	1:50,000
Streptococcus pyogenes	1:30,000	1:60,000

As the temperature of dressings and urine in contact with the body approximates that of body temperature (37°C) this increase in effectiveness at body temperature may be considered a distinct advantage.

4. *Effectiveness at Increasing pH*: The bactericidal activity of the quaternaries increase as the pH increase as proven by the dilution which will kill a culture of Staphylococcus aureus in 10 minutes at 20° C.

Dilution bactericidal to S. aureus in 10 minutes

pH	4	5	6	7	8	9
	1:8000	1:10,000	1:20,000	1:26,000	1:30,000	1:40,000

This effectiveness in alkaline media is particularly applicable to urine infected with urea splitting organisms, since such urine usually has a pH of 7 or above.

5. *Low Toxicity*: Topical application of the bactericide dilutions as low as 1:500 proved non-irritating to the cornea of mice. Considering the cornea as the most sensitive of mucous membranes, dilutions many times this applied

to such a relatively resistant organ as skin may be considered an entirely safe procedure.

An aqueous dilution of 1:1000 as the only source of drinking water for mice over a three-week period caused no death or toxic degenerative changes. This represents a high total dose of 484 mg. of anhydrous Diaparene per kilogram without toxicity. The factor of absorption through the skin in sufficient quantities to cause toxicity appears to be negligible.

The studies of Benson,[8] et al and those of our own, confirm these animal experiments in demonstrating the non-toxic nature of the drug for topical applications.

6. *Physical Properties*: The quarternary ammonium compound may be readily placed into aqueous solutions, or may be made into powder, tablet or ointment, depending upon the nature of the clinical application. It is absorbed by gauze dressings quantitatively from solution and may be kept for one month without loss of potency.

TECHNIQUES

Two basic methods were used. Heretofore we had been in the habit of twice daily dressing post-operative urological wounds and areas reached by urinary drainage with dry sterile dressings. In this study, drums of sterile dressings were rinsed in a 1:5000 solution prior to autoclaving, and the dressings thus prepared were used in the usual twice daily dressings. Similar dressings were used over decubitus ulcers where urinary excoriation was considered an important factor.

Occasionally it was found that in some areas, as for example, where the wound itself proved to be infected, dry dressings failed to give satisfactory results and wet dressings of 1:5000 solution were used.

Patients were selected for study and placed in groups according to the severity of skin pathology. Four groups were studied in order to demonstrate the effect of the technique on progressive pathological change. Using the term "excoriation" to be all inclusive, the four groups were:

1. *Prophylactic*: These patients had just had urologic surgery in which draining fistulae were formed. Impregnated dressings were started on the first post-operative day.

2. *Erythema*: In these patients ammonia irritation had already begun, and was evidenced by erythema of the skin.

3. *Superficial ulceration*: In this group the process had proceeded to the point where breaks in the continuity of the epidermis were present.

4. *Deep ulceration*: This group of patients included all those with ulcerations below the epidermis. In all the patients in this group the bed of the ulcer consisted of muscle, bone, or infected granulation tissue.

RESULTS

In the prophylactic group, eight patients were treated, each with a draining urinary sinus. (Table I.) Of these, five were suprapubic sinuses, one a

nephrostomy sinus, one a ureterostomy sinus and one a perineal sinus. The ages of the patients ranged from 48 to 71, the average being 61 years. In all eight the organisms cultured from the urine were known ammonia pro-

TABLE I

PROPHYLACTIC TREATMENT OF URINARY EXCORIATION

Case	Age	Lesion	Urine Culture	Urine pH	Duration of Therapy	Result
A. S.	66	Permanent cystotomy	B. Coli B. Pyocyaneus	7.0	33 days	No excoriation
A. O.	66	Suprapubic sinus	B. Coli	7.5	23 days	No excoriation
E. H.	66	Suprapubic sinus	B. Coli B. Proteus Strep. Fecalis	6.0	23 days	Minimal excoriation
J. S.	71	Suprapubic cystotomy	B. Proteus B. Coli B. Pyocyaneus	7.5	19 days	No excoriation
I. P.	48	Ureterostomy	B. Pyocyaneus	7.0	16 days	No excoriation
I. M.	69	Suprapubic sinus	B. Coli	7.0	7 days	No excoriation
D. F.	68	Nephostomy sinus	Strep. Fecalis B. Coli	7.0	7 days	Minimal excoriation
E. E.	71	Perineal sinus	B. Proteus	7.0	5 days	Minimal excoriation

ducers. In four, more than one infecting organism was found, and in each of these four the agents of multiple infection were all ammonia formers. B. coli was found in six cases; Pseudomanas pyocyaneus in three cases; B. proteus in two cases; and Streptococcus fecalis in two cases. The urinary pH ranged from 6.0 to 7.5, averaging 7.0. Treatment consisted in using dry sterile dressings impregnated with 1:5,000 solution. Dressings were changed twice a day for a period of 5 to 33 days, the average being 17 days. In five cases protection was absolute, and no excoriation developed. In two cases an area of minimal erythema developed about the edges of the sinus, but was limited to within 3 cms. of the sinus margin. In one case excoriation developed about several deep retention sutures, and remained until the sutures were removed. Although urine continued to bathe the area following the removal of the sutures, after eighteen days of the use of dry sterile treated dressings, the excoriation had completely healed.

IN THE GROUP who presented erythema of the skin, prior to the use of treated dressings, six patients were treated (Table II.). There were two patients with draining suprapubic sinuses, one with a ureteral sinus, one with a nephrostomy and two with perineal sinuses. Ages ranged from 48 to 75, with the average being 63 years. Urinary pH ranged from 6.0 to 7.5 with an average of 6.8. Four of the six patients presented multiple pathogens in the urine. B. coli was cultured from four, Pseudomonas aeruginosa from four, Streptococcus fecalis from one, Staphlococcus albus from one, Staphlococcus aureus from one, and B. proteus from one. In 2 cases, dry dressings were used exclusively, and in four, wet dressings were used. Length of treatment varied from 4 to 10 days, with an average of 7 days. In all cases, the excoria-

TABLE II

TREATMENT OF CUTANEOUS URINARY EXCORIATION WITH ERYTHEMA

Case	Age	Lesion	Urine Culture	Urine pH	Duration of Therapy	Result
M. D.	75	Suprapubic fistula with excoriation	B.Coli Staph. Aureus	7.5	10 days	Complete healing
B. T.	58	Nephrostomy sinus with excoriation	B. Pyocyaneus	6.0	6 days	Minimal residual excoriation
S. P.	48	Suprapubic cystotomy with excoriation	B. Pyocyaneus	7.0	6 days	Minimal residual excoriation
F. N.	65	Perineal sinus with excoriation	B. Pyocyaneus B. Coli Staph. Albus	7.0	4 days	Minimal residual excoriation
P. M.	65	Ureteral sinus with excoriation	B. Coli Strep. Fecalis	6.0	9 days	Complete healing
W. B.	64	Perineal sinus with excoriation	B. Pyocyaneus B. Proteus B. Coli	7.0	8 days	Complete healing

tion was markedly reduced. In two cases excoriation disappeared and healing occurred. In four, the excoriation was reduced to a minimal erythema.

In the group which presented actual excoriation with superficial ulceration, all patients were incontinents (Table III.). There were five in all, three with neurological disease and two with incontinence following urological surgery. The neurological patients had widespread excoriation of the genitals

TABLE III

TREATMENT OF CUTANEOUS URINARY EXCORIATION WITH SUPERFICIAL ULCERATION

Case	Age	Lesion	Urine Culture	Urine pH	Duration of Therapy	Result
J. C.	68	Incontinence with excoriation and superficial ulceration of buttocks	B. Coli	7.0	10 days	Complete healing
P. M.	72	Incontinence with excoriation and superficial ulceration of buttocks	Staph. Aureus	6.5	19 days	Complete healing
J. W.	65	Incontinence with excoriation and superficial ulceration of buttocks	B. Subtilis	5.5	19 days	Complete healing
G. B.	64	Incontinence with excoriation and superficial ulceration of penile meatus	B. Proteus B. Coli B. Pyocyaneus	7.0	11 days	Minimal residual excoriation
W. R.	71	Incontinence with excoriation and superficial ulceration of penile meatus	B. Coli	5.5	21 days	Minimal residual excoriation

and buttocks. All were confined to bed or wheelchair. No attempt was made to divert the stream by indwelling catheter. The urological patients presented superficial ulceration of the urethral meatus and the glans penis. Each of these patients was equipped with a penile bag for the collection of urine. Ages varied from 64 to 72, with an average of 68 years. The urinary pH ranged from 5.5 to 7.0 with an average of 6.3. Mixed infection was found in only one case. B. coli was found in three cases, B. proteus in one case, Pseudomonas aeruginosa in one, Staphlococcus aureus in one and B. subtilis in one. All cases were treated with dry dressings. The longest period of treatment was 21 days, the shortest 10 days, the average being 16 days. In the neurological incontinents the results were most satisfactory with the superficial ulceration and erythema practically absent at the end of the period of therapy. Then penile lesions of the urologic patients using bags also responded well with only mild erythema remaining.

IN THE GROUP with deep ulceration, there were four patients (Table IV.). Three were incontinent as a result of pathology of the central nervous system

TABLE IV

TREATMENT OF CUTANEOUS URINARY EXCORIATION WITH DEEP ULCERATION

Case	Age	Lesion	Urine Culture	Urine pH	Duration of Therapy	Result
W. B.	71	Incontinent with excoriation and deep ulceration of buttocks	B. Coli B. Proteus	7.5	8 days	Improved
T. S.	47	Ulcerated carcinoma of penis with surrounding urinary excoriation	B. Coli Staph. Aureus	5.5	21 days	Improved
S. P.	64	Incontinent with excoriation and deep ulceration of buttocks	No growth	7.0	12 days	Improved
H. B.	39	Incontinent with excoriation and deep ulceration of buttocks	B.Coli	7.0	12 days	Improved

and were completely bedridden. The fourth suffered from carcinoma of the penis. The neurological incontinents were completely bedridden and suffered from ulcers of the genitalia and decubitus ulcers of the buttocks, coccygeal and trochanteric regions. The area which we attempted to protect in the patient with carcinoma of the penis was a large cauliflower-like neoplasm which had completely replaced the penis. Ages ranged from 39 to 71, averaging 55 years. B. coli was found in three cases and was mixed with S. aureus in two cases. Urinary pH ranged from 5.5 to 7.5 with an average of 6.8. Two patients presented mixed infections and one persistently had no growth. An attempt was made to adapt the treatment to the particular region. The duration of treatment ranged from 8 to 21 days with an average of 13 days.

Wet soaks of 1:5000 were used on the carcinomatous ulcer for 21 days. Improvement was noted insofar as infection and exudate were markedly reduced and the mass lost its foul odor. One patient showed definite improvement in the ulcers, on treatment with dry dressings, but expired in cardiac failure before healing. It was found that dry dressings could not be applied to the ulcers and an ointment containing the same agent as the dressings was applied with the dressings for 12 days. Very marked improvement of the ulceration was noted.

SUMMARY AND CONCLUSIONS

1. The role of urine in the pathogenesis of cutaneous excoriation is described as resulting from free ammonia released by the action of urea splitting organisms on urine.
2. A substance, para di-isobutyl-cresoxy-ethoxy-ethyl-dimethyl benzyl ammonium chloride monohydrate, (Diaparene) is described as having the appropriate bactericidal action on these urea splitting organisms. A method of prophylaxis and treatment of urinary excoriation by means of impregnated dressings is outlined. The results of this treatment on 23 neurological and urological patients is reported.
3. Diaparene impregnated dressings, diapers, or towels are effective prophylactically and therapeutically for urinary excoriation. A water-miscible ointment with this chemical may be used as an adjunct where ulceration has occurred.

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The Use of Digitalis in the Aged

Albert Mueller-Deham, M.D.*

DIGITALIS was introduced into medical practice more than 150 years ago. It is remarkable that after all this time we are still not fully informed about the mechanism and chemism of its effects.

But at least there is general agreement on its main therapeutic uses in congestive heart failure, speedy auricular fibrillation, and some forms of paroxysmal tachycardia. This is the teaching of medical schools and the majority of physicians keep entirely within these limits, a minority see a wider field for its application. First attention is given the undoubted indications as they pertain to the peculiarities of the aged patients.

The outstanding considerations are: Proper dosage, avoidance of side effects, and choice of the preparations. Again there is unanimity that only standardized products should be used, tested by physiological action or by the weight of pure substances.

Three trends are open to question: First, the tendency to schematize the therapeutic dosage; then, its use for quick, full digitalization; and last, the modern preference for digitoxin.

Objections can be raised against full submission to these views, which are particularly important for the aged patients.

The slogan, *Standardization of drug, individualization of dosage,* is worth remembering. Individualization of dosage is necessary because the reaction and sensitivity of the abnormal heart to digitalis varies widely.

The following two instances illustrate this fact well. A woman of 66 years had been affected since childhood with rheumatic heart disease (mitral insufficiency and aortic stenosis). In her present condition she depends entirely on salt-poor diet, mercurials, and digitalis.

It was noted that she did not tolerate digitalis well. The indication was obvious. The pulse rate was over 100. Three cat units were prescribed. On the next day it went down to 70, the second to 40 with a true bradycardia. At present her maintenance dosis consists of between two to three cat units weekly. Even with this small amount the electrocardiogram shows signs of digitalis effect.

This is contrasted by another case. A man of 70 with arteriosclerotic and hypertensive heart disease, severely congested, demanded not less than 30 units for full digitalization and keeps a maintenance dosis of three units. The usual prescriptions would have been very dangerous, perhaps fatal for the first patient, quite insufficient for the second.

Perhaps these instances represent extremes, but the need of a two or threefold variation in dosage occurs frequently.

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THERE are remarkable differences between the pharmacological and clinical actions of digitalis. Under its influence more forceful contractions are seen in all animals on the transfused heart or on an isolated strip of muscle. But any obvious effect is missed when a therapeutic dosage is given to a healthy man in normal condition, or to patients with impaired circulation during shock, infections or thyrotoxic tachycardias.

The modern methods of estimating the heart output by gas analysis of arterial and venous blood, the latter won by catheterizations of the right auricle, or the studies with the ballistocardiogram have given evidence that digitalis injections decrease, paradoxically, the blood flow in healthy individuals and in heart patients whose output is not reduced. Wherever the output is subnormal in congestive heart failure, digitalis raises the output distinctly, at least in the great majority of cases.

The prevailing precondition for a clinical digitalis effect is a heightened sensitivity to these substances. This is again bound regularly to a hypertrophy and dilatation of the heart, as Starling and Edens pointed out long ago. The reason for this is not known. The inevitable conclusion of these facts is that digitalis must be used individually and with caution.

Further, reasons for this principle are given by the frequent side effects following our prescriptions, consequences which become more frequent in advancing years. Nausea and vomiting need only be mentioned. These troubles are not serious yet not easily overlooked. The disturbances of rhythm are more important. True uncomplicated bradycardia has already been mentioned. It must be differentiated from other forms: first, from an only apparent bradycardia where every normal systole is followed by an extrabeat coupled to it, a digitalis bigeminy where the second contraction does not reach the pulse; second, from incomplete or complete heart block. Only every second, third or fourth beat of the auricles is followed by ventricular contraction, or auricles and ventricles act independently, due to disturbance of conductivity which can also lead to the so-called Wenckebach periods where every third, fourth or fifth pulse drops out regularly.

Digitalis bigeminy appears also as a regular sequence of large and smaller pulses. Extrabeats are often provoked by our drug. They are not important if they do not happen too frequently, only—just as the signs of digitalis effect on the electrocardiogram—a warning. But an abundance of such abnormal contractions are a serious complication which may lead to a quite irregular action with many ineffective efforts of the heart, to auricular fibrillation or the full picture of intoxication.

STANDARDIZATION of treatment, full digitalization with a typical dosage and maintenance in a similar way, has been recommended by prominent men, such as Cohn of the Rockefeller Hospital and Gold from the Cornell University. Their material probably was based on records of younger patients with rheumatic heart disease, and that even their side effects were

not considered sufficiently. I do not agree in principle, and find its application to aged patients even more dubious.

The term "quick digitalization" means nowadays quick and *full* digitalization; it means giving the whole standardized dosage at once or in one day, followed by maintenance.

There are justifiable reasons for declining this method in principle, and for the aged. The objections have already been given. The possibility of severe, even dangerous side effects becomes too great. The cases where one cannot wait two or three days for full digitalization under close observation are extremely rare, however, there is the pressing need for a quick effect in many cases. Quick is used here in the ordinary sense, i.e., speedily initiating. I distinguish between *quick* and *full*. This subject leads to the choice of preparations.

Standardized full leaf tablets need not be discarded for ordinary use. They are cheap and reliable. But every physician should, in addition, be acquainted with at least one second choice where the drug, through removal of ballast substances, has become even more tolerable and resorbable for speedier action.

So many good tablets or liquids of this type (digitalis purpurea or lanata) are on the market that preference is a matter of opinion. However, I hold to digitalis purpurea. The preparation chosen could also belong to the next type, which, by almost immediate action is suitable for emergency cases. This indication is usually fulfilled orally by digitoxin and by injections given intramuscularly or intravenously. They come from digitalis purpurea and lanata or from the strophantin group, the latter only for intravenous use.

The advantages of digitoxin lie in its simple application, chemical purity and speedy effect. But objections can also be raised—not against its use, but its abuse and preference. It has been advocated most impressively by Gold as superior, with a standard dosis for full digitalization of about one mg., and maintenance with a tenth.

It is generally known that the various alkaloids of the digitalis group vary in their qualities, even if standardized on one or more of the tests. They vary in their toxicity, in firmness and duration of their chemical binding to the heart muscle, and in other respects.

Now, digitoxin did not originally acquire the second half of its name in vain. It is the most toxic of all the group. This has been shown and has been confirmed lately by the investigations of Rothlin, who found that it kills more of the animals used, the signs of myocardial damage as revealed by electrocardiogram and histological examination are greater, and its binding to the heart is of greater duration. Clinical observations, my own and those of Masters, de la Chapelle and others, substantiate this view. A careful physician can apply digitoxin with good effects, but I do not use it.

Injections are preferred if quick action is needed. Ampules of both digitalis purpurea and lanata are at disposal, but the strophantin group has a

special place. It is a matter of opinion whether oubain or strophantin K is given. The latter is my special preference.

THERE is still prejudice to be overcome as many physicians consider these substances unsafe, an opinion resulting from the fact that, at first, all too large doses were recommended—one mg. But precautions make their use very safe. Strophantin should always be injected very slowly, and when the patient has not received digitalis before. Only in critical emergencies can one neglect a maintenance dosis. The first tentative dosis should not exceed a quarter or fifth of a mg., and the highest dosis should not exceed half a mgm. The effect is instantaneous and striking.

Strophantin injections are unique in two respects, experimentally and clinically. Experimentally, strophantins are the only substances of the digitalis group which increase the output even in healthy individuals or in heart patients with normal output, as MacMichael has shown. Clinical experience has shown that congestive failure in some patients can be improved who were hitherto refractory to any other digitalis treatment. Therefore, it can be tried if all others fail.

When a patient in need of digitalis produces side effects before the optimal result is reached, the digitalis should be combined with quinidin, which should also be used to correct signs of digitalis intoxication affecting the rhythm of the heart beats.

Again, a prejudice against such a combination lives on, but is not justified.

Let us not forget that the first introduction of quinine for treatment of heart troubles by Wenckebach consisted of such a combination, and further, that (MacMichael) quinidin does not decrease the mechanical efficiency of the heart, but raises it during heart failure.

The advantages of such a method have been frequently observed. A low amount of quinidin (three times 0.2 gm.) should be used to be adjusted and increased individually.

THE PRECEDING uses of digitalis are universally accepted. The following are those which have been found beneficial but have not been generally acknowledged.

Most authorities keep to the rule that during myocardial infarctions due to coronary disease digitalis is only in place if congestion develops.

This is an accepted principle. However, when all the usual methods have been applied and, nevertheless, the patient lies prostrate, in pain, pale and blue, with a very weak pulse and low blood pressure, and in immediate danger of death, an intravenous injection of a quarter of a fifth mg. of strophantin can be tried and eventually repeated. This method is used only exceptionally in this country but has been recommended by Eden for 15 years. I have used it in many desperate cases. True, the majority died, but rarely without first showing a distinct, although transitory, improvement of pulse and gen-

eral condition. Many patients recovered quite unexpectedly for weeks, months and even years.

In 4 cases death soon followed the injections after an initial recovery. Three came to autopsy where a tamponade of the pericardium with blood due to a perforation was found in all. A connection between perforation and injection is probable. But I can count at least 15 patients who were saved by this method.

It is advisable, however, to inform the families or other attending physicians that the injection provides a last chance under desperate circumstances and to ask permission, best in writing, just as the surgeon does before a very dangerous operation.

Whoever is afraid of strophantin may use digitalis injections, but their effect is not the same.

Such results in an acute emergency are not easy to explain. That digitalis has no significant influence on the normal heart has been noted previously, but "under normal conditions," should be added because even healthy individuals react to it under strain.

It was, furthermore, pointed out that the sensitivity to digitalis is usually bound to hypertrophy and dilatation of the heart muscle.

This organ is very often thickened and enlarged in the aged; the left heart due to arteriosclerosis and hypertension, the right due to pulmonary emphysema, rigidity and other affections. It stands under strain and, therefore, the presupposition for digitalis effect is given, even if no manifest congestion obtains.

A trial with cautious digitalization is justified whenever a dilated or hypertrophic heart does not work optimally.

The necessary dosage is low, usually two to three tablets (0.1) for a few days, followed by one tablet. The medication is futile if no clinical improvement results within two weeks, otherwise it can be continued with intermissions. One frequently observes in aged patients that shortness of breath from exertions lessens, anginal sensations become rarer, headache and digestive troubles improve and that emphysematous asthmatics breathe easier.

This idea is shared, for instance, by Christian and cardiologists of the Mayo Clinic. The maintenance dose must, however, be controlled by clinical observation and electrocardiograms, watching for lengthening of conductivity time or other digitalis effects. Reduction of the daily dose to a half or a third may become advisable.

Such observations can also be applied to aged patients during infections, before and after operations and in shock.

Digitalis is useless for younger persons in similar conditions, but this does not apply equally to the old.

It is unnecessary to mention that digitalis therapy is only a small part of heart treatment, that all other means, i.e., rest and diet, diuretics, oxygen, and so on, must be adequately employed. This paper is restricted to digitalis

alone. It is intended as a plea for individualization against standardization, for some widening of the accepted indications and as a demonstration that these drugs must, at times, be applied differently to the aged in comparison with younger groups.

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Peptic Ulcer in Old Age

Erving F. Geever, M.D.*

Interest in cancer of elderly people should not obscure the possibility and great risk of peptic ulcer. Several fatal cases were observed by Erving F. Geever, M.D., at ages of 65 to 83 years. Treatment is likely to be neglected because symptoms are often atypical and accounts of early manifestation misleading.

During the confusion of senility or shock, pain is denied and long-standing gastrointestinal disturbance forgotten. An old man will complain only of minor heart trouble and refuse hospitalization, or insist that he was perfectly well until last week.

In some cases several unsuspected ulcers are present. While a posterior duodenal lesion irritates the pancreas and elevates serum amylase, the anterior crater may rupture into the peritoneal cavity.

After perforation the abdomen may be soft, with no rebound tenderness; radiography may fail to show air under the diaphragm. Acute peritonitis frequently causes no fever, rise in leukocyte count, or nausea and vomiting.

Symptoms are variously ascribed to malignant tumor, cholecystitis, intestinal obstruction, and reflex pyloric spasm. When hemorrhage and shock of peptic ulcer are unrecognized, mortality almost equals the rate for gastric carcinoma.

Ill-defined alimentary disorder in old age warrants the most careful roentgen and laboratory examination. Within 12 hours after perforation life may be saved by simple closure.

*Fatal Chronic Peptic Ulcer in the Aged. Rocky Mountain M. J. 46:553-558, 1949.

Sickle-Cell Anemia in Patients Over Forty-Five

Report of Two Cases

By Ferdinand Fetter, M.D.* *and Truman G. Schnabel,* M.D.*

OUR INTEREST IN the subject of sickle-cell anemia in elderly patients was aroused when a 62-year-old Negro with this disease came under our care. We then recalled a 47-year-old woman with the disease whom we observed for a 2-year period some years ago. The relative rarity of the disease in patients in the older age group prompted this report.

It is true that sickle-cell anemia in the majority of cases is a disease of children and young adults. In fact, Wintrobe[1] has stated that it is seen particularly in young individuals because it is not compatible with a full life span. However, we believe that it occurs often enough in middle-aged and elderly patients so that it must be considered in the differential diagnosis of anemias, and especially of hemolytic anemias, in elderly Negroes. There are a few references in the literature to cases of sickle-cell anemia in elderly patients. For example, Sydenstricker,[2, 3] in 2 papers published in 1924, referred to 3 sickle-cell anemia patients of 78, 72, and 62 years respectively, who died and were autopsied, and he spoke of a 67-year-old living patient with the disease. Steinberg,[4] in a comprehensive review of the subject in 1930, pointed out that the disease may first manifest itself in elderly people. Kracke[5] noted that the disease has been reported in very elderly patients, and confirmed Sydenstricker's impression that the prognosis is not necessarily bad in the old age group. In some patients with sickle-cell anemia, after repeated attacks in the young adult period, Kracke reported that the interval between attacks becomes longer and each crisis becomes less severe, until eventually all evidence of the disease disappears except the sickle-cell trait.

THE FACTORS that produce the active disease in Negroes with the sickle-cell trait are not known. Possibly infections or the development of other pathologic processes as new growths or hypertension may act as precipitating factors in older patients. Whatever these causative factors may be, the majority of Negroes with the sickle-cell trait who develop sickle-cell anemia do so early in life with no apparent provocation, while a few do not develop the disease until middle or even old age, when possible provocative factors are more likely to come into play. Of course the majority of Negroes with the sickle-cell trait go through life without ever developing the disease.

SUMMARY OF CASES OF SICKLE-CELL ANEMIA AT PRESBYTERIAN HOSPITAL SINCE 1935

In going over the cases of sickle-cell anemia at Presbyterian Hospital

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since January 1, 1935, we found 19 patients. Of these, the youngest was 18 months old when first seen, and the oldest was 62 years. Ten of the patients, 53 per cent of the total, were under 20 years of age, confirming the recognized high incidence of the disease in the younger age groups. However, 7 patients, 37 per cent of the total, were over 30 years of age when first seen. Table I shows the age distribution of these 19 patients.

TABLE I

AGE DISTRIBUTION OF NINETEEN PATIENTS WITH SICKLE-CELL ANEMIA

Age in Years	Number of Patients
0-4	3
5-9	1
10-19	6
20-29	2
30-39	4
40-44	1
over 45	2

CASE REPORTS

Case 1. S.S. C., Negro male, aged 62 years, was admitted to the Medical Service of Presbyterian Hospital at 9:15 P.M. on August 6, 1948, with the chief complaint of pain in the back and the suprapubic region. His present illness began at about 2:00 A.M. on August 5, 1948, with sharp stabbing pain in the lumbosacral region, radiating to both groins and to the suprapubic area. The pain became increasingly severe and necessitated the administration of morphine prior to admission. There was also a history of passing small amounts of blood in the urine for a week before admission, and of urinary frequency and urgency during the same period of time. He was catheterized in the receiving ward of the hospital, and 960 cc. of urine were obtained.

In his past medical history, he had slight intermittent hematuria in 1935, lasting 4 to 5 days. This was attributed to prostatitis and prostatic hypertrophy. On March 27, 1945, he had been admitted to the Brewster Hospital in Jacksonville, Florida, complaining of weakness, dizziness, shortness of breath, and some rectal bleeding. According to information received from this hospital, his admission blood count on March 27, 1945, was hemoglobin 4.5 gm. per 100 cc. of blood, (26 per cent); red blood count 2,210,000 per cu. mm.; white blood count 6,050 per cu. mm., with 76 per cent polymorphonuclear leukocytes, 22 per cent lymphocytes, 1 per cent monocytes, and 1 per cent eosinophiles. The blood smear showed hypochromia, polychromatophilia, anisocytosis, and slight poikilocytosis. He was given 10 blood transfusions and by May 15, 1945, his blood count was normal, with hemoglobin 14.5 grams (85 per cent), and red blood count 4,910,000 per cu. mm. However, hypochromia, anisocytosis, and poikilocytosis were still found in the

blood smear. Sickle cells were not reported in any of the blood smears, but no wet films of blood were examined. In retrospect, however, it appears that the anemia at this time was a manifestation of sickle-cell disease, as it was out of proportion to the amount of rectal bleeding the patient described. X-ray study of the colon by barium enema on April 30, 1945, showed no abnormalities. On May 17, 1945, hemorrhoidectomy was done for internal and external hemorrhoids. Subsequently, he remained in good health until his present illness.

On his present admission, his temperature was 100° F., his pulse rate was 110 per minute, his respiratory rate was 36 per minute, and his blood pressure was 170/110 mm. of mercury. He was somewhat irrational and appeared acutely ill. The heart showed no significant abnormalities except the rapid rate. The abdomen was tremendously distended and tympanitic. There was generalized tenderness throughout the abdomen, and a questionable mass was felt in the left upper quadrant. Peristalsis was not heard. Rectal examination showed grade 3 symmetrical non-nodular enlargement of the prostate gland. The clinical impression was benign prostatic hypertrophy with retention of urine, and paralytic ileus. On August 7, 1948, he was seen in consultation by members of the urologic and surgical departments, and the following treatment was started: Wangensteen suction through a Levine tube, retention catheter in the bladder, a rectal tube after a cleansing enema, and intravenous infusions of 5 per cent dextrose in normal saline solution and in distilled water.

THE PARALYTIC ILEUS persisted until August 9, 1948, when he started to have spontaneous bowel movements and to pass large amounts of gas by rectum. His general condition began to improve at this point, and the Levine tube was removed on August 10, 1948. With the disappearance of the abdominal distention, the mass in the left upper quadrant could be definitely identified as an enlarged spleen, extending 4-fingers' breadths below the left costal margin.

His blood count on August 7, 1948, was hemoglobin 10.3 grams per 100 cc. of blood, (66.5 per cent); red blood cells 4,000,000 per cu. mm.; white blood cells 13,800 per cu. mm., with 63 per cent polymorphonuclear leukocytes and 37 per cent lymphocytes. The red blood cells on the stained smear showed anisocytosis, occasional basophilic stippling, and moderate polychromatophilia. On August 11, 1948, the hemoglobin had fallen to 7 grams per 100 cc. of blood, (45.1 per cent) and the red blood count to 2,420,000 per cu. mm. There had been no gross bleeding from the genitourinary tract in the 2 day interval between these blood counts. On August 13, 1948, sickle cells were noted in the blood smear, and examination of a wet film of blood showed many sickled red cells. Re-examination of a wet blood film on August 17, 1948, was again strongly positive for sickling. Malarial parasites were not seen in any of the blood smears. Examination of bone marrow aspirated from the sternum on August 18, 1948, showed a pre-

dominance of normoblasts and late erythroblasts. The cellular content of the marrow was that of erythroid hyperplasia, and the bone marrow was considered by the pathologist* as compatible with a diagnosis of sickle-cell anemia in the active stage.

On AUGUST 13, 1948, cystoscopic examination and bilateral retrograde pyelograms were done. The diagnosis of third degree prostatic hypertrophy was confirmed. In the pyelograms, the right side was normal, but the filling on the left side was incomplete. The enlargement of the spleen was confirmed by this X-ray study.

Other laboratory studies were as follows: Urinalysis on August 7, 1948, showed 2 plus albumin, no sugar, and microscopic examination showed occasional hyaline casts, and 25-30 white blood cells and 50-60 red blood cells per high-power field. On August 7, 1948, the blood sugar was 82 mg. per cent, the blood urea nitrogen was 16 mg. per cent, the blood carbon dioxide combining power was 56 volumes per cent, and the blood chlorides were 600 mg. per cent. The blood Kolmer Wassermann reaction and the Eagle and Boerner-Jones-Lukens flocculation tests were all negative on August 7, 1948. On August 19, 1948, his blood acid phosphatase was 0.4 unit. On the same date, the bleeding time was 2 minutes, the clotting time 4 minutes, and the platelet count was 170,000 per cu. mm. On August 21, 1948, the prothrombin time was 12 seconds (100 per cent of normal) and the blood fragility test showed slightly increased resistance of the red cells to hypotonic saline solution, with hemolysis beginning in 0.36 per cent saline solution and being complete in 0.28 per cent saline solution.

On August 23 and 24, 1948, the patient was given blood transfusions of 500 cc. each with no untoward reaction. On August 25, 1948, his hemoglobin was 11.2 grams per 100 cc. of blood (72.4 per cent), and his red blood cell count was 5,150,000 per cu. mm. On August 26, 1948, he was transferred to the urologic service of Dr. J. C. Birdsall, and next day suprapubic prostatectomy was done by Dr. H. L. Warres under spinal anesthesia. The microscopic diagnosis was benign prostatic hypertrophy. The patient's postoperative course was satisfactory. On August 28 and 30, 1948, he was given blood transfusions of 500 cc. each, again without reaction. On September 16, 1948, his hemoglobin was 11.2 grams (72.2 per cent), and his red blood count was 5,000,000 per cu. mm. The differential sedimentation rate test described by Winsor and Burch[6] was done on the same day. The sedimentation rate on venous blood was 5 mm. in 1 hour, and on oxygenated blood 25 mm. in 1 hour, the difference of 20 mm. confirming the diagnosis of sickle-cell anemia. The patient was discharged from the hospital in good condition on September 17, 1948.

Subsequently, he has continued to feel well and has resumed his usual activities. His blood count done at the Brewster Hospital, Jacksonville,

*We are indebted to Edward B. Smith, M.D., formerly associate director of the department of pathology of Presbyterian Hospital, for his interpretation of the bone marrow, and also for his examination of the microscopic sections of the prostate gland.

Florida, on November 3, 1948, showed hemoglobin 12.5 gm. (80 per cent); red blood cells 4,320,000 per cu. mm.; white blood cells 6,600 per cu. mm., with 56 per cent polymorphonuclear leukocytes, 41 per cent lymphocytes, and 3 per cent monocytes. In wet preparations of the blood, 9 per cent of the red blood cells showed sickling in 1 hour, 28 per cent in 6 hours, and 90 per cent in 20 hours.

Case 2. C. H., Negro female, was 46 years of age when first seen in the Medical Outpatient Clinic of the Presbyterian Hospital on March 29, 1935. Her chief complaints were general weakness and pain in the left wrist and in both ankles. She had had attacks of migratory painful swollen joints, involving chiefly the ankles and wrists, each winter for the past 5 years. The weakness had also been present for 5 years, but had become more marked during the previous 3 or 4 months. Physical examination showed the mucous membranes to be pale, and the sclerae to be slightly icteric. The left wrist was swollen and tender, with some limitation of motion. There were no other significant abnormalities.

Initial blood count March 29, 1935, showed hemoglobin 6.9 grams per 100 cc. of blood (46 per cent); red blood cells 2,340,000 per cu. mm.; white blood cells 13,150 per cu. mm., with 65 per cent polymorphonuclear leukocytes, 29 per cent lymphocytes, 4 per cent eosinophiles, and 2 per cent basophiles. On the stained smear, many sickled red blood cells were seen, and also polychromatophilia, anisocytosis and poikilocytosis. The blood Kahn test of March 29, 1935, was negative. On April 12, 1935, a wet preparation of blood also showed many sickled red blood cells, confirming the diagnosis of sickle-cell anemia. On April 25, 1935, the red blood count had fallen to 1,999,000 per cu. mm., and the hemoglobin to 6.3 gm. (42 per cent). The reticulocyte percentage was 15.2 per cent, and the fragility test showed increased resistance to hypotonic saline solution, with hemolysis beginning at 0.34 per cent saline solution and being complete at 0.18 per cent saline solution. The serum bilirubin was 1.8 mg. per cent.

The patient was first hospitalized from May 21, 1935 to June 20, 1935, during which time she received 2 blood transfusions of 500 cc. each. Subsequent hospitalizations were on September 24, 1935, March 28, 1936, and October 23, 1936, all for the purpose of receiving blood transfusions. On each admission, she was severely anemic, but not in an acute crisis, complaining only of weakness and migratory joint pains. Our last blood count was on December 21, 1936, when her hemoglobin was 4.65 grams (31 per cent); red blood count 1,560,000 per cu. mm., and white blood count 12,300 per cu. mm. She was last seen in the follow-up clinic on June 19, 1937. She was then free of joint pains and felt fairly well. Since this time, we have been unable to keep her under observation.

COMMENT

The enlarged spleen in case 1 is of special interest. It is generally believed that the spleen is small in adult patients with sickle-cell anemia. Wollstein and Kreidel[7] reported a correlation between the size of the spleen and the

age of the patient with this disease, the organ being enlarged in children and small in adults. Yet Sydenstricker[3] reported a spleen weighing at autopsy 460 grams in his 78-year-old patient with sickle-cell anemia, and he[2] also noted an enlarged spleen with infarcts at necropsy in his 62-year-old patient. Steinberg[4] has correlated the size of the spleen with the frequency and severity of exacerbations of the disease rather than with the age of the patient, the spleen enlarging during the first few attacks and then decreasing in size with repeated attacks. This conception appears to be the correct one, and explains the enlarged spleen in our 62-year-old patient, who was seen in his second crisis, and in the 2 patients reported by Sydenstricker.

The relative mildness of the disease in older patients is illustrated by our second patient. Although her blood count was extremely low throughout our period of observation, and although the increased serum bilirubin was confirmatory evidence of increased hemolysis, she did not present at any time the picture of an acute hemolytic crisis seen so often in young patients with the disease.

SUMMARY AND CONCLUSIONS

1. Two cases of sickle-cell anemia in patients over 45 years of age are presented.

2. These patients were 2 of 19 cases of sickle-cell anemia seen at Presbyterian Hospital since January 1, 1935.

3. This disease occurs often enough in old patients so that it should be considered in the differential diagnosis of anemias in elderly Negroes.

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OLD PEOPLE'S WELFARE*

A group of Londoners interested in old people's welfare have formed a new research group to study and attempt to solve some of the problems of old age aside from the major problem of health. Population experts have predicted that Britain will eventually become a nation with an unwieldy number of persons beyond the working age. This new geriatrics research will attempt to find some useful part which these old people can play in the community without forfeiting the happiness and leisure which they have earned. Aside from this, old people have other special problems in Britain today, such as housing needs, suitable holiday provision, and household help. None of these problems have been fully studied by any other welfare association.

*Medical Press, No. 5748:3, July 6, 1949.

Priscoline and Arteriosclerotic Peripheral Vascular Disease

Max P. Rogers, M.D.*

THE PRESENT day medical lecturer, in picturing the relationship of medical science to our everyday life, has his own pet phrase to describe our period. One hears that "this is the day of penicillin," or this is the "age of atomic medicine," or "this is the era of radioactive therapy." To me, though, such men have missed completely one of the most important "ages" that medicine has yet experienced. I think that our present-day advances in medicine and surgery might well be called the "age of the aged."

Geriatric medicine and surgery has made remarkable advances during the past decade, even to the extent of becoming a specialty in itself. With such advances, the general practitioner, the internist, and the surgeon finds that the average age of his patients is gradually increasing, and it becomes a necessity to avail himself of the latest knowledge of treatment of the geriatric patient.

With the rising age level of his patient the physician soon realizes that one of the most important of all diagnoses is that of arteriosclerosis. While it seems to be a normal process in the aging of the human organism, and one recognized for many years in all of its varying pathological manifestations, it has remained one of the most unyielding, regardless of the mode of therapy. Our armamentarium in the treatment of arteriosclerosis has been scanty and poor. As a result, the profession generally has reached the point where it is all too prone to advise the arteriosclerotic to just "take it easy."

Beside the cardiac involvement seen in generalized arteriosclerosis, perhaps the most common symptom-producing syndrome is that of arteriosclerotic peripheral vascular disease. The clinical history and physical findings are, for the most part, very typical. The patient, usually above 45, comes in because of pain and aching in the calves of his legs on walking, and/or night cramps or "restless legs." Further questioning usually reveals the fact that he is bothered with "cold feet," his feet frequently become bluish during cold weather requiring the wearing of heavy socks, associated with tingling, numbness, and burning of his feet. It is not unusual for such a person to give as his chief complaint "the circulation in my legs is bad."

Physical examination readily bears this out. Ophthalmoscopic examination will reveal narrowing and silvering of the retinal arterioles. Examination of the extremities will show, in the more advanced cases, a smooth glossy skin, decreased peripheral pulsations, plantar ischemia on elevation and exercise, with delayed venous filling and rubor on dependency. Exami-

*From the Burrus Clinic, High Point, North Carolina.

nation of other peripheral arteries, particularly the radials and brachials, will show cord-like structures.

THOSE of us interested in peripheral vascular surgery, are finding increasing encouragement in the benefits of lumbar sympathectomy. Various authors are advising the use of this procedure, particularly in early arteriosclerosis. It is thought by some that each step taken by a sympathectomized limb gives the same results as a Buerger's exercise, and that a patient may not get complete benefit from a lumbar sympathectomy for a full year.

There are some patients, however, for whom a sympathectomy is not feasible, whether for physical or economic reasons. It is in such a case that our outlook has been gloomy in the past. Here we have had to use our old phrase, "take it easy," which often is not any more feasible than a surgical procedure, whether for physical or economic reasons.

Our "age for the aged," however, has brought new hope and relief in the treatment of such a patient. In studying various drugs which might be useful in the treatment of hypertension, those with sympatholytic properties came to the attention of research men. The fact that a sympathectomy could be accomplished temporarily by means of a drug was intriguing, and a tremendous amount of research has resulted in making two of such agents available commercially.

The first compound to be made available to the profession generally is Etamon (tetraethylammonium chloride). This proved to have definite sympatholytic properties, but unfortunately it must be administered intramuscularly or intravenously. The second drug is Priscoline (2 benzyl 4,5 imidazoline). This has the advantage that it may be given orally, intramuscularly or intravenously. This drug, then, becomes of much greater import since the general medical or surgical practitioner may dispense it in oral form in the usual office routine for the ambulatory patient, as well as use it in the hospital by the parenteral route.

Priscoline, then, was chosen for a study of its sympatholytic properties generally, and this paper deals with the results obtained in those patients with obliterative arterial disease on an arteriosclerotic basis.

Table I shows the tabulated results of treatment in fifteen cases of arteriosclerotic obliterative disease which were treated with Priscoline tablets orally.

AN ANALYSIS of the results reveals some interesting facts. The ages in this group ranged from 46 to 79 years, while the average age was 60 years. Males predominated in this series, nine to six, and there were twelve white and three colored patients. All patients presented themselves because of pain in their legs, and some of them had superimposed infections or ulcers. The duration of their pain varied from four months to five years, the average duration being two years and nine months.

Physical examination revealed, in every case, evidence of arterial insuffi-

TABLE I

Case Number	Age	Sex	Race	Duration	Initial Maximum Oscillometric Reading in millimeter		Max. Oscillometric Reading after Priscoline in millimeter	
					Right	Left	Right	Left
1	61	F	W	5 years	5.0	5.5	6.0	6.5
2	60	M	W	1 year	1.5	1.25	2.25	2.0
3	70	M	W	3 years	4.0	5.0	5.0	5.0
4	60	M	W	3 years	5.0	2.0	5.5	3.0
5	57	F	W	4 months	1.5	0.5	2.5	2.0
6	46	F	W	5 years	8.0	6.0	9.0	9.0
7	66	M	C	3 years	3.5	1.0	4.5	2.0
8	50	F	W	5 years	5.0	4.5	8.5	6.0
9	50	F	C	1 year	2.5	1.5	5.0	2.5
10	75	M	C	2 years	4.5	5.0	5.0	6.0
11	50	M	W	1 year	1.5	4.5	3.0	5.5
12	79	F	W	4 years	2.0	1.5	2.0	2.0
13	51	M	W	2 years	1.5	0.0	2.25	0.5
14	67	M	W	5 years	0.5	1.5	0.75	2.0
15	59	M	W	1 year	4.5	2.0	4.5	2.5

ciency of the extremities. In addition to the usual clinical examination, all patients had oscillometric studies done using the Collins sphygmo-oscillometer; usually the recordings were the midcalf values. During the latter phase of this study, the oscillometric studies were correlated with those of the skin temperature as determined by a McKesson Dermalor.

Table II shows the results of the oscillometric readings.

TABLE II

	— Range —		— Average —	
	Right	Left	Right	Left
Initial Oscillometric Readings Legs	1.5 - 8.0	0.0 - 6.0	3.3 mm.	2.75 mm.
Oscillometric Readings of Legs after Priscoline Therapy.....	2.25 - 9.0	2.00 - 9.0	5.15 mm.	3.7 mm.

In examining these findings, it is seen that the range of readings is large. This is explained by the fact that an individual patient may have a normal reading in one leg, with fairly severe arterial damage in the other which accounts for frequently missed diagnoses. Also, it is interesting that the left leg appeared to be more severely damaged than the right. The important fact is, however, that in every case, there was definite, measurable improvement following Priscoline therapy. It might seem that an oscillometric increase of only 0.5 mm. would be insignificant, but when one considers that the 0.5 mm. increase occurs with each stroke of the heart, then during a twenty-four hour period the increased amount of blood circulating through the involved extremity would mean a great deal to oxygen-hungry tissues.

PRISCOLINE, however, is not without its disadvantages and not all patients are able to take the drug. The side effects are, in most cases, not too unpleas-

ant, and usually they subside after a forty-eight to seventy-two hour period. These effects are—(1) increased pilomotor activity with "goose flesh" and a crawling sensation of the scalp, (2) a feeling of "squeamishness" in the stomach, (3) sometimes flushing of the face, (4) and occasionally some palpitation. These side effects are usually found in the lower dosage schedule of the drug, i.e., 25 to 50 mgm. t.i.d. q4h, or q3h. In the higher dose range (50-75 mgm. per dose), however, dizziness from hypotension may occur. The patients in this series received 25 mgm. doses three to five times daily, and, with the exception of three cases, they had no side effects after seventy-two hours. The three patients mentioned, though, continued to complain of some "squeamishness" in their upper abdomen as long as they continued their medication.

Although no difficulty, other than the side effects previously mentioned, was encountered in this series, a word of caution should be given in regard to those cases of arteriosclerosis associated with moderate to severe coronary insufficiency and those cases of marked hypertension. With a dose of 25 mgm., Priscoline may produce some acceleration of the heart and an increase in systolic blood pressure of approximately eight millimeters of mercury. For this reason, in such a case, it might be well to begin treatment with a schedule of 25 mgm. of Priscoline taken with the meal, and after forty-eight hours, the interval between doses may be cautiously shortened.

SUMMARY

THIS report concerns a group of fifteen geriatric patients with a very common syndrome—arteriosclerotic peripheral vascular disease. In the past, these patients would have necessarily had to gradually decrease their activity as their disease progressed. Their future would have been to "just warm the bench" in order to prevent pain, ulcers, and eventual gangrene. By means of a sympatholytic drug, Priscoline, they have been able to increase the circulation in their extremities, thereby allowing a much more active existence, and delaying the sequelae of a progressive arterial obliteration. The drug is not a panacea for all arteriosclerotic patients, but it is a ray of hope for many.

CONCLUSIONS

(1) Arteriosclerotic peripheral vascular disease is a more common finding as the age level of patients increases.
(2) The history and physical findings are typical of progressive arterial obliteration in adult patients usually above the age of 45.
(3) Priscoline, a sympatholytic drug, produces peripheral vasodilatation giving both subjective and objective benefit.
(4) Priscoline may be administered in tablet form to the average ambulatory patient with safety and with caution in those patients with coronary insufficiency and marked hypertension.
(5) A valuable adjunct to the therapy of arteriosclerosis is herewith offered.

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Priscoline used in this study was furnished by the Ciba Pharmaceutical Company, Summit, N. J.

Acknowledgment is expressed to Ida M. Sykes for assisting in this study.

Rehabilitation with Chronic Medical Disease

Otto Eisert, M.D.*

No matter how poor the prognosis, bedridden patients may become ambulant and fairly active for their remaining years. Disabilities from paralysis, arthritis, and many other ailments are overcome in a five-point program directed by Otto Eisert, M.D.

Invalids with the average age of 55 were trained after they had been hospitalized a few months to 10 years in hospitals. Of 128 who took the course, 116 achieved 50 to 100 per cent self care and the majority went home.

The service provides physical, occupational, corrective, educational, and manual arts therapy. Walking, stair climbing, speech for the aphasic, social adjustments, and industrial skills are taught, as well as reading, writing, and other academic subjects.

Training periods vary from a month and a half for arteriosclerosis obliterans of the legs to 8 months for paraplegia. Strength and coordination improve with multiple sclerosis, hemiplegia, Parkinson's disease, Buerger's disease, heart disorders, asthma, diabetic gangrene, syphilis of the central nervous system, and cirrhosis of the liver.

Each case requires individual treatment applied with common sense, perseverance, and ingenuity. If a man with bilateral cerebral thrombosis tends to fall backward, high heels may restore balance until natural equilibrium returns.

After discharge outpatient care may be started; when necessary, transportation is provided. Psychiatrist, social worker, and vocational adviser aid the transition to family life and work.

*Rehabilitation of the Chronic Medically Ill. Arch. Phys. Med. 30:441-445, 1949.

GERIATRICS

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Aging and Chronic Illness

Though the problems of chronic illness and geriatric medicine are not identical, they overlap and have many characteristics in common. Except for such disorders as tuberculosis, syphilis, poliomyelitis, rheumatic fever, and schizophrenia, almost all the chronic disorders which constitute the immense and growing burden upon society are intimately associated with senescence. The incidence of circulatory disorders, cancers, the arthritides, diabetes mellitus, and the like rises sharply after 40. The phenomena of senescence contribute to the progression of these characteristically insidious and progressively disabling disorders. Today, approximately 80 per cent of all deaths are consequent upon chronic illness.[1]

The problems of chronic illness are something more than individual clinical questions; facilities for care and rehabilitation, employment opportunities for the partially disabled (handicapped), detection of progressive disorders in their incipiency, encouraging preventive[2] or, at least, retardive therapy are all involved. Attack upon the problems of chronic illness will require not only the best scientific brains, but also coordination of effort. The social consequences of chronic illness are immeasurably significant.

In November and December, 1946, the American Hospital Association, American Medical Association, American Public Health Association, and American Public Welfare Association each appointed representatives to constitute the Joint Committee on Chronic Disease "to hold joint conferences and to consider possible studies for the purpose of defining certain fundamental problems of importance in national and local planning for chronic illness."

All these associations had expe-

rienced the pressure of the growing burden of chronic disease and disability. All realized that to continue the prevailing uncoordinated and unplanned efforts would result in plans inconsistent with sound administrative and professional practice.

There appeared to be a need for an authoritative statement on planning for the chronically ill, which would represent the best judgment of the four participating associations. *Planning for the Chronically Ill,* therefore, was formulated by the Joint Committee, adopted by all four associations, and published in October, 1947.[3]

In May, 1948, the National Health Assembly, held in Washington, D. C., recommended that the Joint Committee on Chronic Disease be expanded to a National Commission, with increased membership, backing, and responsibilities.

In keeping with this recommendation, the Joint Committee soon constituted itself a National Interim Commission on Chronic Illness, under the chairmanship of Dr. James R. Miller of Hartford, Connecticut, who, as a representative of the American Medical Association, was one of the original members of the Joint Committee on Chronic Disease. On May 20, 1949, an expanded, and more permanent National Commission on Chronic Illness came into being at a meeting held in Chicago. The members of the Interim Commission representing the four national professional organizations remain as members of the permanent body. They are, in addition to Dr. Miller, who becomes vice chairman of the permanent commission, J. Douglas Colman and Dr. Albert A. Snoke, representing the American Hospital Association; Dr. Thomas A. McGoldrick, representing the American Medical Association; Dr. Dean W. Roberts and Dr. Edward S. Rogers, representing the American Public Health Association; and Dr. Ellen C. Potter and Judge Thomas S. Waxter, representing the American Public Welfare Association.

The new commission will have a maximum of 30 members, all of whom will serve without remuneration. They include prominent citizens from all parts of the country, representing the broad fields of industry, medicine, education, labor, farming, religion, public health, and hospital administration, as well as the general public. Among them are: S. Bruce Black, President of the Liberty Mutual Insurance Company, Boston; Miss Sarah Blanding, President of Vassar College; Joseph W. Fichter, Master of the Ohio State Grange; Walter Reuther, President of the United Auto Workers, C. I. O.; Dr. Thomas Parran, Dean of the Graduate School of Public Health, University of Pittsburgh; Dr. Ward Darley, Dean of the School of Medicine, University of Colorado; Karl P. Meister, Executive Secretary, Board of Hospitals and Homes of the Methodist Church; and Mrs. Joseph T. Ryerson of Chicago. Mr. Leonard Mayo, Vice President of Western Reserve University, Cleveland, was elected Chairman of the Commission.

The Commission will have the advantage of expert counsel and guidance from a group of 32 technical advisors, who have been selected on the basis of their accomplishments in the five fields which will be most pertinent to the Commission's work: clinical problems (including prevention and research); institutional care (including hospitals and nursing homes); non-institutional care; rehabilitation and convalescence; and community problems. Chairmen for these group meetings, which were set up along the lines of the advisors' fields of interest, were: Dr. Ernst Boas, New York; Dr. Jack Masur, Director of the Clinical Center, National Institutes of Health, Bethesda,

Maryland; Dr. Martin Cherkasky, Director of the Home Care Program, Montefiore Hospital for Chronic Diseases in New York; Dr. Howard Rusk, Director of the New York University and Bellevue Hospital Rehabilitation Centers in New York; and Dr. Lester Breslow, Chief of the Chronic Disease Division, California State Department of Health.

The technical advisory groups also included such well known clinical and sociological experts as Dr. Donald B. Armstrong, Second Vice President of the Metropolitan Life Insurance Company; Dr. Daniel G. Blain, Medical Director, American Psychiatric Association; Dr. E. M. Bluestone, Director of Montefiore Hospital for Chronic Diseases in New York; Dr. Charles Cameron, Medical Director, American Cancer Society; Dr. Nila Covalt, Hartford State Veterans Hospital, who addressed the last meeting of the American Geriatrics Society at Atlantic City, June 4, 1949; Dr. Albert Kaiser, Health Officer of Rochester, New York; Dr. William B. Kountz, Washington University, St. Louis; Miss Ollie Randall, Consultant, Community Service Society, New York; Dr. James E. Perkins, Director of the National Tuberculosis Association; and Dr. Edward J. Stieglitz of Washington, D. C.

With such advisors, the Commission on Chronic Illness should become a significant and valued force in enhancing geriatric medicine through guidance in research programs, community planning for services and facilities, and particularly, in educating the public as a whole in the complexity, urgency, and magnitude of the problems of long-term impairment of health so closely related to the phenomena of senescence. The address of the Commission on Chronic Illness is 535 North Dearborn Street, Chicago 10, Illinois.

—EDWARD J. STIEGLITZ

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Of 210 patients 60 years of age or over, with intestinal obstructions, admitted to Philadelphia General Hospital, over a five-year period, 113 died—a total of 53.8 per cent!

This startling figure is but one revealing aspect of an acute medical problem brought out in INTESTINAL OBSTRUCTIONS IN THE AGED by Drs. L. Kraeer Ferguson, Delbert C. Smith, and Paul C. Houston of the Philadelphia General Hospital. For this, and other illuminating articles, see the November-December issue of GERIATRICS.

B. I. P. provides Safe relief from Arthritis pain . . .

B. I. P.* is a bacterial protein used as a desensitizing vaccine to produce symptomatic relief and a continued sense of well being in chronic arthritis patients.

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DIGESTS *from Current Literature*

Centenarians. The Syndrome of Normal Senility.

IVAN BASYLEWICZ, M.D. *Rhode Island Med. Jour.* 32:315-326, 1949.

Extreme age is not always accompanied by pathologic mental and physical changes. An individual may reach the age of ninety or one hundred and still be practically sound.

Of 38 nonagenarians and 34 centenarians studied by Ivan Basylewicz, M.D., only 9 were definitely ill. Most of the subjects were agricultural workers who had been of robust constitution with considerable endurance and muscular strength, and members of long-lived families.

In normal senility, the personality structure is well-preserved. Central nervous system changes produce a weakening of central control of autoregulatory functions, and a general impairment of reflex sensitivity and reactivity. Memory, alertness, and interest in daily activities are maintained.

The basal metabolism is decreased. Structural and functional changes in the organs and systems correlate well with the reduced metabolic needs of the body. The heart is atrophied and the output of blood reduced. Hematopoiesis is generally weakened, but the oxygen-carrying capacity of the blood is not appreciably reduced. Respiratory function is sufficient for conditions of rest or moderate exercise. Digestive functions are retarded but adequate.

All systems are less adaptive to situations involving an increased body load. Blood sugar levels are within normal limits, but a hyperglycemic curve with a retarded return to normal following ingestion of glycogen or injection of epinephrin indicates an impairment of carbohydrate metabolism. An inferiority in fat-lipoid metabolism is indicated by an almost complete loss of subcutaneous fat with a corresponding increase in all of the principal lipoids in the plasma.

Both height and weight are considerably reduced. Skin, mucous membranes, and muscles are atrophied. The relatively good preservation of the skeletal system makes independent activity possible despite the weakened condition of the muscles.

Our Aging Population

LOUIS I. DUBLIN, Annual Forum, N. Y. Chapter Chartered Life Underwriters, Metropolitan Life Insurance Company, 1949.

The census of 1950 will show more than 11 million people, or 7.7 per cent of our total population, to be over 65 years of age. The proportion of older people has doubled in the last half century, and the absolute numbers have almost quadrupled.

Cessation of immigration, reduction in birthrate and improved survival have radically changed the pattern of our age distribution in the past 50 years, declares Louis I. Dublin, Ph. D., of the Metropolitan Life Insurance Company.

Foremost among the problems of the aged is the struggle for material security. Only one-fourth of the people over 65 are employed, and the majority are men working on farms.

Sixty per cent of the aged population receive income from private and public retirement plans, investments or social security insurance. The other forty per

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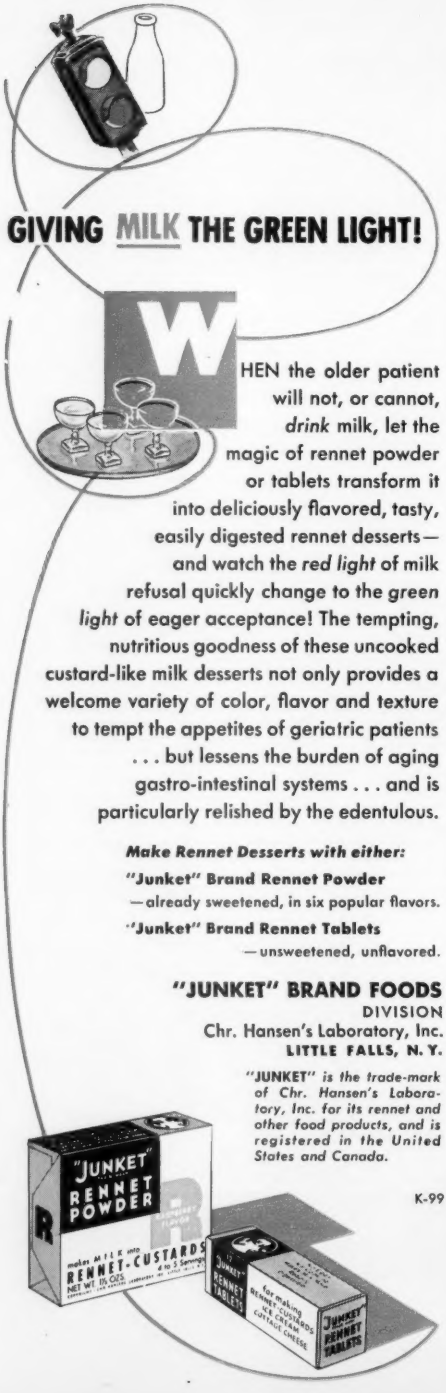
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cent constitute the indigent, and are cared for by relatives and friends, or receive old age assistance from federal, state and local grants.

The well-being of the aged must include provisions for adequate housing and medical care. A few communities have housing projects especially designed for elderly people.

Old people suffer from a variety of chronic diseases. The few hospitals for chronic disease are always filled, and patients are kept waiting until beds are available. Many ill or disabled persons could be cared for at home. Any work that is suited to their strength and skill will add to their happiness and improve their health.

Geriatrics and Gerontology in Everyday Practice

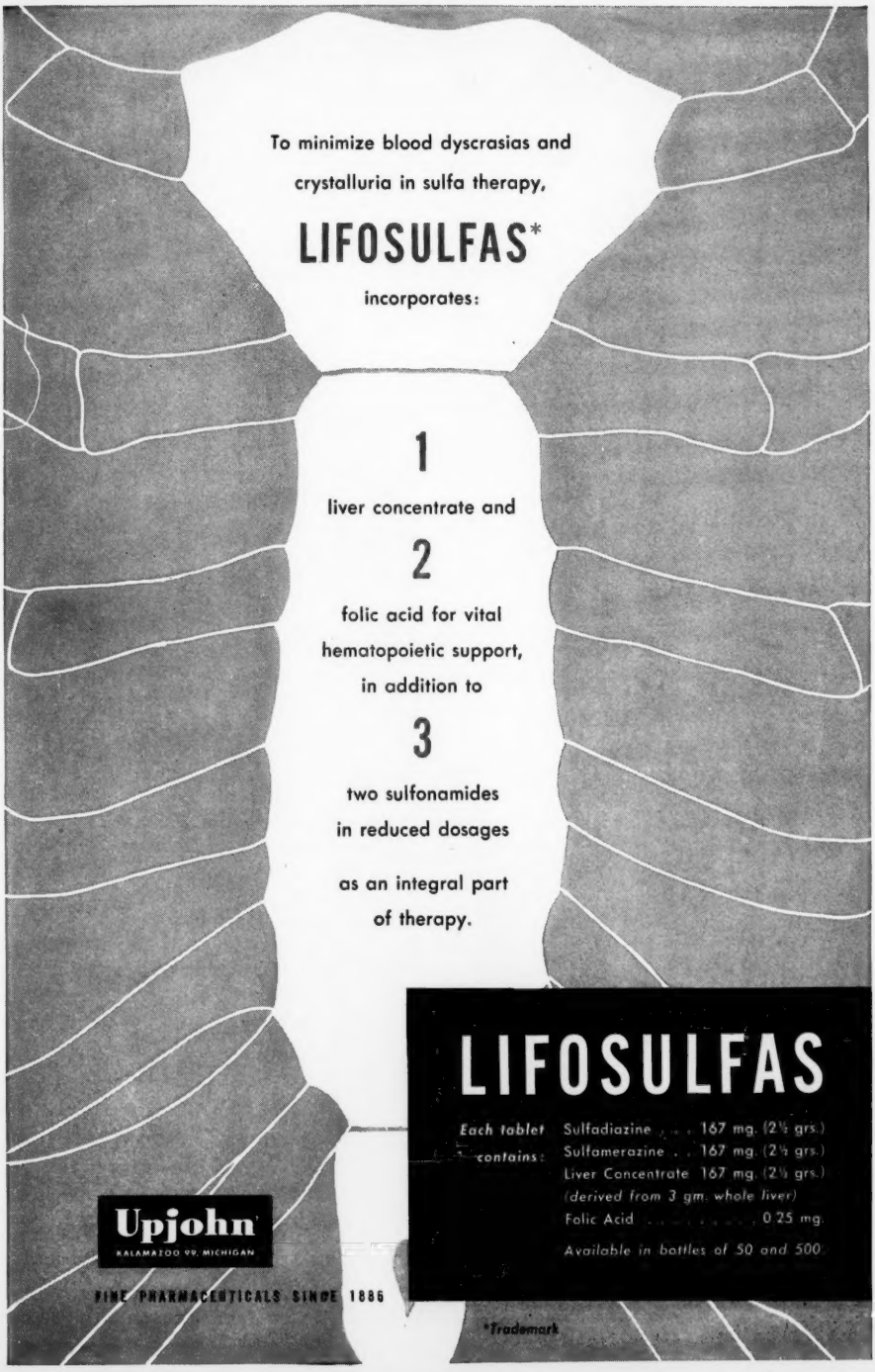
RAPHAEL GINZBERG, M.D., *Individual Psychology Bulletin*, Vol. VII, First Quarter, 1949. Reprinted from Metropolitan Life Insurance Company Statistical Bulletin.

Modern knowledge of geriatrics cannot be put to practice as long as public opinion regards old age as a period of decay. Environmental factors, forced inactivity, and the feeling of uselessness are more responsible than old age for deterioration in an individual, states Raphael Ginzberg, M.D., of New York.

Social and psychological conditions of elderly persons in Great Britain have improved much more than they have here. Public support is responsible for the passage of the National Assistance Bill, which will provide adequate housing for every elderly person in Great Britain. Rent will be economical, and eviction impossible.

Some attempts have been made here to improve the lot of the aged. Minor housing units have been set up, and private clubs have helped their elderly members find employment and recreation. Full-time recreation as a substitute for a job is no consolation to a man who wants to work. It only convinces him that there is no room for him in active life.

Despite the excellent record made by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the elderly worker during the manpower shortage, he now finds it difficult to get a job. Another depression may put fifteen million workers out of jobs. Men over 45 years of age would be affected most.

Dr. Ginzberg suggests that old people take a more active part in helping themselves to a better life. Public opinion would be impressed by groups and organizations of elderly people, inspired to fight for their emancipation. Efficient writers, publicists and speakers might be found who would unite to defend themselves and to fight for a creative and useful life.

The Importance of the Family in the Prevention of Mental Illness

KARL A. ZIMMERMAN, M.D., *The Milbank Memorial Fund Quarterly*, Vol. 27, 1949.

Family consultation clinics provide a means of offering preventive mental health service to large numbers of people. Karl A. Zimmerman, M.D., Consultant for Mental Health of the State of California Department of Public Health, holds a weekly clinic to which are referred families seen previously by nurses in other public health services. The clinics not only provide guidance for the families referred, but also serve as a means of teaching modern psychological and sociological concepts to the public health nurses so that they might be better able to deal with family problems encountered in their regular work.

Psychologists and sociologists recognize the family as perhaps the most important dynamic entity with which to deal and plan in relation to the prevention of mental illness. Interactions within the family produce the basis for personality structure and provide opportunities for growth.

When difficulties in adjusting to new situations force families to seek outside help, the individual's and the family's ability to meet problems can be evaluated and development guided in a healthy direction. In order to deal adequately with the problems presented, family workers need to be skilled in

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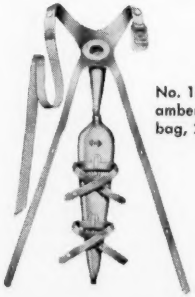

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interviewing techniques, and to have a working knowledge of individual development and of the cultural and social family problems in their communities.

Treatment of Papillary Adenomas of the Rectum.

GEORGE E. BINKLEY, M.B. (Tor.), DOUGLAS A. SUNDERLAND, M.D., and CHARLES J. MILLER, M.D., *N. Y. State Med. J.*, Vol. 49: 1791-1793. 1949.

Benign and atypical papillary adenomas of the rectum, frequently found in elderly patients, have a marked tendency to become malignant. Treatment should seek complete eradication of the polyp rather than relief of symptoms. In a report on 51 patients with an average age of 61 years observed from 1922 to 1943, George E. Binkley, M.B., Douglas A. Sunderland, M.D., and Charles J. Miller, M.D., emphasize the need for repeated proctoscopic examinations and biopsies to govern treatment. Original

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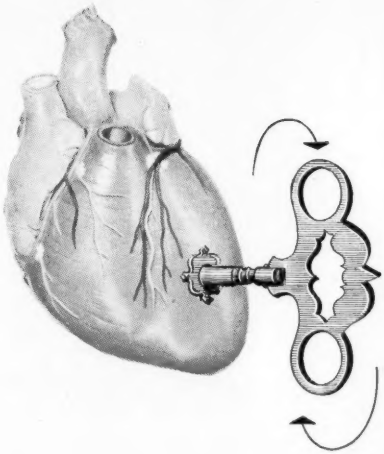

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biopsy studies suggested that 58 per cent of the series were benign but final judgment after years of followup showed that only 10 per cent remained purely non-malignant. Cancer was demonstrated in 62 per cent of the cases.

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ERRATA AND AN OMISSION
(IN THIS ISSUE)

Table of Contents page. For *Trevor Howell, M.D.*, read *Trevor Howell, M.R.C.P., Ed.*

Page 276. Footnote beginning *Eschatin, Parke Davis & Co.*, should carry *. Word "diet," next to last line on page, should carry † and second footnote should carry †.

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by C. Ward Crampton, M.D.
author of *What Geriatrics Means to the Medical Profession.*

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GERIATRICS

Hyperthyroidism in Patients Over Sixty

Elmer C. Bartels, M.D.,* *and J. W. Kingsley, Jr.,* M.D.†

HYPERTHYROIDISM is a disease of all ages but many clinicians have noted the altered response of older patients to this metabolic disturbance. Lahey coined the term "apathetic hyperthyroidism" to designate these older patients who do not present the cardinal signs and symptoms of the disease. Increasing interest in gerontology has led us to review a series of cases of hyperthyroidism encountered in patients over the age of 60 years. In addition to covering the diagnostic aspects in these patients, evaluation was made of the effectiveness of treatment with antithyroid drugs. The cases of primary hyperthyroidism and adenomatous goiter with hyperthyroidism in the elderly were reviewed separately and then compared in order to determine any clinical variations.

MATERIAL

AMONG the first 1000 consecutive patients with hyperthyroidism to receive antithyroid drugs in this clinic in preparation for thyroidectomy were 124 patients (12 per cent) who had passed the age of sixty; these patients were chosen for this study.

FINDINGS

FIGURE 1, showing the incidence of hyperthyroidism by decades, demonstrates that the greatest number of patients were between the ages of 30 and 60; 107 patients were between 60 and 69, and 17 were between 70 and 77. Of these 124 patients, 48 (39 per cent) had primary hyperthyroidism, while

*Department of Internal Medicine, The Lahey Clinic, Boston, Massachusetts.
†Fellow in Internal Medicine, The Lahey Clinic, Boston, Massachusetts.

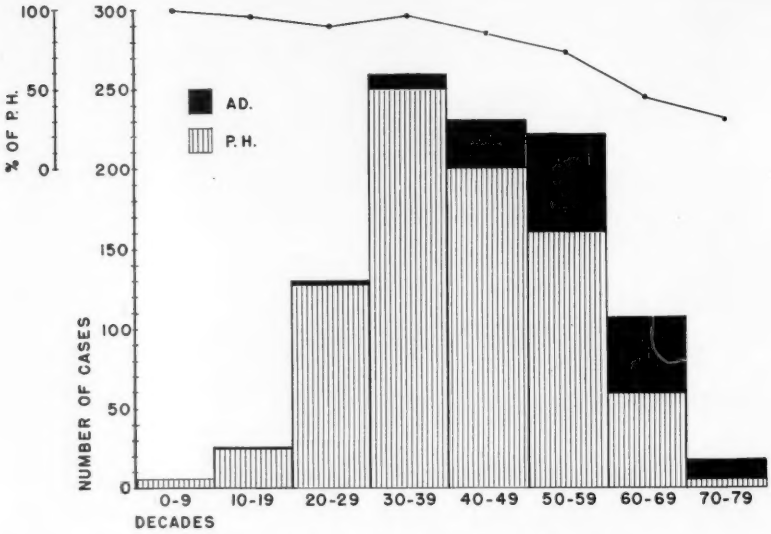

Fig. 1. Hyperthyroidism according to age and type.

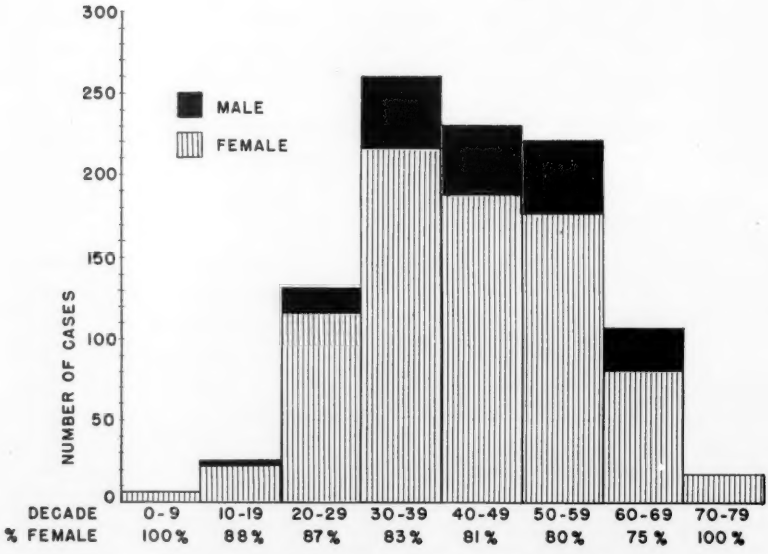

Fig. 2. Hyperthyroidism according to sex and age.

the remaining 76 (61 per cent) had hyperthyroidism secondary to adenomatous goiter. Primary hyperthyroidism predominated up to the age of 50, after which the incidence of adenomatous goiter rose sharply. Seventy-two per cent of patients in the sixth, 45 per cent in the seventh, and only 30 per cent in the eighth decade had primary hyperthyroidism.

Approximately 80 per cent of all cases of hyperthyroidism occurred in females and this sex distribution held reasonably true in the upper decades (Fig. 2). Of the 48 patients with primary hyperthyroidism and the 76 with adenomatous goiter with hyperthyroidism, 33 (69 per cent) and 65 (85 per cent), respectively, were women.

Weight loss was the presenting symptom in 70 per cent of the patients with primary hyperthyroidism, 31 per cent complained of muscular weakness and 25 per cent of palpitation. Exertional dyspnea and palpitation were present in 35 per cent of patients with secondary hyperthyroidism, with generalized muscular weakness mentioned more consistently than any other complaint. Only one-fourth of the latter group complained of a decline in weight; however, careful questioning disclosed that almost all had lost weight. Sixteen per cent of both groups complained of increased nervousness. The relative infrequency of nervousness and emotionalism is indicative of the altered response of the elderly to hyperthyroidism, since these symptoms are among the earliest and most consistent manifestations of the disease in younger patients. That cardiac symptomatology was most prominent in secondary hyperthyroidism was in no way surprising; however, it was not as common as had previously been supposed since in younger patients with adenomatous goiter, palpitation and dyspnea are usually the initiating symptoms.

THE duration of primary hyperthyroidism was three years or less in all cases, in 73 per cent less than two years. One-half of the patients with adenomatous goiters had had symptoms for more than two years and some for as long as 10 years. Our experience with younger patients has shown that most patients with primary hyperthyroidism come under treatment within 10 to 12 months following the onset of symptoms, while in cases of secondary hyperthyroidism there is an average time lapse of about 20 months.

Forty of the 76 patients with adenomatous goiter were aware of the presence of an enlarged thyroid, in 31 cases for more than five years (6 patients for five to 10 years, 7 patients for 10 to 20 years, 9 patients for 20 to 30 years, 7 patients for 30 to 40 years and 2 patients for 40 to 50 years). On the other hand, only one patient with primary hyperthyroidism was aware of an enlarged thyroid, an occurrence which is quite understandable when the weights of the glands removed at operation are considered.

Although an increased appetite is common in hyperthyroidism, it was the exception among the elderly patients. Only 12 per cent of patients with primary hyperthyroidism had an increased desire for food, 56 per cent reported no change and 32 per cent actually had a decrease in appetite. The

figures were 5 per cent, 76 per cent and 19 per cent, respectively, for patients with secondary hyperthyroidism. Vitamin deficiency, rarely seen in younger patients, was not uncommon.

A WEIGHT loss in excess of 30 pounds occurred in slightly more than one-half of patients with primary hyperthyroidism and in one-third with adenomatous goiters. All but 4 patients with primary hyperthyroidism and 11 with adenomatous goiter lost more than 10 pounds. Ten per cent of each group lost more than 50 pounds. Although patients with secondary hyperthyroidism lost only slightly less weight than those with primary hyperthyroidism, the decline in weight was so gradual that as a rule it caused less concern than in those with primary hyperthyroidism.

On specific questioning, tremor of the hands, a common symptom of thyrotoxicosis, was mentioned by 66 per cent of patients with primary hyperthyroidism and by 42 per cent of those with secondary hyperthyroidism. Also, 41 per cent with primary and 17 per cent with secondary hyperthyroidism admitted heat intolerance while approximately 70 per cent of each group, when questioned, thought they were slightly more nervous. These symptoms were for the most part difficult to evaluate but certainly they were not outstanding. Gastrointestinal symptoms were rarely encountered.

Despite the presence of severe hyperthyroidism in many cases, only one-third of the patients in each category appeared stimulated. Eye signs were present in only 21 cases with primary hyperthyroidism, stare in 8, mild exophthalmos in 9, edema of the lids in 2, and external ophthalmoplegia without exophthalmos in 2. A few patients with adenomatous goiter were thought to have stare but in none was the evidence indisputable.

Fine tremor of the hands was noted by the examiner in many patients who were not aware of its presence. Noticeable increased warmth of the hands and body was present in nearly all patients with primary and in two-thirds (66 per cent) of those with secondary hyperthyroidism. This increased body warmth suggested the diagnosis of hyperthyroidism more often than any other single sign with the exception of thyroid enlargement.

The thyroid glands of patients with primary hyperthyroidism were not greatly enlarged to palpation and in two instances were not felt; however, when palpable, there was definite firmness of the gland. The adenomatous glands were usually felt.

Tachycardia was not a prominent feature inasmuch as 30 per cent of each group had pulse rates below 100 beats per minute. Only 5 per cent with primary hyperthyroidism and 13 per cent with adenomatous goiter had initial pulse rates of 120 or more per minute. Since the pulse rate tends to decrease with age, a rate of 100 in a person in the seventh decade is fully as significant as a rate of 120 in a patient 30 years of age. Auricular fibrillation, either paroxysmal or persistent, was present in 21 per cent of those with primary and 32 per cent of those with secondary hyperthyroidism, and as further evidence of advanced heart strain, 7 patients (14 per cent) of the former and

15 patients (19 per cent) of the latter had congestive cardiac failure. Varying degrees of hypertension were present in two-thirds of the entire group and an equal proportion had pulse pressures over 60 mm. of mercury, the latter consistent with hyperthyroidism or advancing generalized arteriosclerosis.

TWELVE of the patients with adenomatous goiters had diabetes mellitus. This condition was present in 3 patients with primary hyperthyroidism. A wide variety of other diseases was encountered but none was statistically significant.

The range of the basal metabolic rates before treatment is shown in Table I, and indicates that although hyperthyroidism may be less manifest in

TABLE 1

BASAL METABOLIC RATE

	Cases with primary hyperthyroidism		Cases with secondary hyperthyroidism	
Not taken prior to starting treatment	2		8	
+10 to +19	2	48%	11	60%
+20 to +29	5		10	
+30 to +39	15		20	
+40 to +49	10	52%	14	40%
+50 to +59	10		5	
+60 or above	4		8	
	48		76	

the elderly patient, the degree of hyperthyroidism is equal to that of younger individuals who usually present unmistakable hyperthyroid symptoms and signs. Although the basal metabolic rates tend to be considerably higher in primary than in secondary hyperthyroidism, this did not hold true in these older patients. This can best be attributed to the relatively long duration of the hyperthyroidism in the patients with adenomatous goiter who delay in seeking medical care.

TREATMENT AND RESULTS

ALL PATIENTS of this series received thiourea compound in preparation for surgery. Of those with primary hyperthyroidism, 24 received thiouracil in a daily dose of 600 mg.; 1 received thiobarbital, 50 mg. daily; and 23 received propylthiouracil, 200 to 300 mg. daily. Forty patients with adenomatous goiter were given thiouracil and 38 propylthiouracil, 2 receiving both drugs. Because the aim of treatment was the attainment of a near euthyroid state and in many cases further improvement of the patient's general health it was thought advisable to continue medical treatment even after the basal metabolic rate had fallen to normal.

The group with primary hyperthyroidism gained an average of 12½ pounds on treatment, with several gaining 25 pounds or more. The patients with adenomatous goiter gained an average of only 5 pounds with 25 per cent remaining stationary and 5 patients showing a decrease because of loss of edema fluid. The lesser weight gain in the latter group is not readily explained, for the average duration of antithyroid treatment in this group was 69 days as against 55 days for the group with primary hyperthyroidism. Experience with the administration of antithyroid drugs has demonstrated that the basal metabolic rate in primary hyperthyroidism will fall about 1 per cent per day, while the decline in secondary hyperthyroidism averages 0.5 per cent daily—thus a longer time is required to accomplish control of the disease in patients with nodular goiters. Since wide exceptions to this rule do occur, much longer treatment was at times necessary.

The average basal metabolic rate in primary hyperthyroid cases was plus 6 at the end of antithyroid treatment, with a range of plus 20 to minus 18. In the other group the average rate was plus 16; some of the patients were operated on before it was realized that longer treatment was necessary for those with adenomatous goiters.

Thiouracil caused fever in 2 patients, skin eruption in 1 and 3 patients developed varying degrees of leukopenia or granulopenia—a reaction rate of 9 per cent. Fewer reactions (4 per cent) were produced by propylthiouracil, 1 patient developing granulopenia and another both leukopenia and skin rash. In 2 cases of leukopenia due to thiouracil, treatment was interrupted briefly and then successfully resumed with propylthiouracil. As precautionary measures, all patients were warned of possible untoward reactions and leukocyte and differential counts were taken at least every two weeks.

Lugol's solution was administered to patients with primary hyperthyroidism during the last three weeks of medical treatment prior to thyroidectomy. Digitalis was given preoperatively to all patients who had auricular fibrillation.

The anesthesia course, a test of adequate preoperative treatment, was almost uniformly satisfactory. Only 3 patients with primary hyperthyroidism and 9 with secondary hyperthyroidism had pulse rates over 100 during operation. Brief cardiac arrest with complete recovery occurred in 2 cases. One-stage subtotal thyroidectomy was performed in 123 cases; the remaining patients underwent a first-stage operation prior to the advent of thiouracil. Thiouracil was used in preparation for the second stage operation which was carried out without incident. Prior to 1943, two-stage operations were necessary in about half of patients of comparable age. Preoperative antithyroid treatment has also reduced the postoperative morbidity and the period of hospitalization is now at least one-fourth of that previously required, with most of the patients of the present group having the thyroidectomy the day after admission to the hospital and leaving the hospital by the sixth postoperative day.

Postoperative complications among the 48 patients with primary hyperthyroidism were infrequent: hematoma of the operative site occurred in 3 cases, unilateral cord paralysis and transient left pneumothorax in 1 patient each. Four of the 76 patients undergoing operation for adenomatous goiter developed auricular fibrillation postoperatively, 1 had a brief period of sinus tachycardia of 140 and another had transient heart block with a ventricular rate of 44. One patient had transient tetany, 2 temporary unilateral paralysis of the vocal cord, 2 pulmonary atelectasis and 4 hemorrhage into the operative wound.

One thyrocardiac who received antithyroid treatment for 12 months in preparation for surgery died suddenly on the second postoperative day. At necropsy, extensive coronary artery disease was found. This single fatality represents an operative mortality of 0.8 per cent for this series, as opposed to 2.5 per cent in a comparable group of patients operated on prior to 1943.

The weights of the diffuse hyperplastic glands removed at operation ranged from 20 to 65 gm., with an average weight of 26 gm. The nodular goiters averaged 105 gm. in weight, with a range of 20 to 410 gm. Twenty-six of the specimens weighed in excess of 100 gm. The relative smallness of the goiters of the patients with primary hyperthyroidism explains why they were so frequently overlooked.

Cancer of the thyroid was not found in any of the goiters. In 4 there was microscopic evidence of strumitis. Interestingly, in several cases the clinical and pathologic diagnoses were at variance. In 9 cases of clinical primary hyperthyroidism, the pathologic report was multiple colloid adenomatous goiter with secondary hyperplasia, while the converse occurred twice. This discrepancy can be explained by the occasional presence of adenomas in diffusely hyperplastic thyroid glands and by the rarer coexistence of both diseases in the same gland.

All patients have been followed for from three months to five years. There have been no instances of persistent or recurrent hyperthyroidism. Myxedema developed in 7 patients, 4 of whom have required continuous treatment with thyroid extract. In 1 case hypoparathyroidism has persisted beyond the immediate postoperative period and requires calcium and vitamin D therapy for control.

SUMMARY AND CONCLUSIONS

Hyperthyroidism is not uncommon in individuals past 60 years of age. Adenomatous goiter was responsible for the disease in about two-thirds of 124 cases in this older age group. Females predominated in a ratio of 4 to 1.

Weight loss was the most prominent symptom in primary hyperthyroidism, while the development of general debility seemed most often to cause patients with secondary hyperthyroidism to seek medical care. A decrease in appetite was more common than an increase. Increased nervousness was rarely volunteered as a complaint.

The objective finding of increased body warmth was a most valuable clue to the correct diagnosis. Stimulation was the exception, therefore the designation "apathetic hyperthyroidism" was appropriate for many of these patients. Eye signs were not outstanding as diagnostic aids. Likewise, tachycardia was not a prominent feature as one-third had pulse rates below 100 beats per minute.

Auricular fibrillation was present in about a fifth of the patients with primary hyperthyroidism and one-third of those with secondary hyperthyroidism. Cardiac decompensation developed in 20 per cent of the entire series. In approximately one-half of the cases the initial basal metabolic rate was over plus 40.

The relatively late diagnosis of hyperthyroidism in elderly patients was probably attributable to its insidious onset, atypical symptomatology and to the assumption by the patient, and occasionally by the physician, that the symptoms were due entirely to age. The failure to make early diagnosis frequently led to states of marked physical depletion. Despite the fact that many patients had nodular goiters for many years, hyperthyroidism was frequently unrecognized for a surprisingly long time. Since there is a likelihood of patients with adenomatous goiter eventually developing hyperthyroidism if they live long enough, in addition to the danger of malignancy, early removal of adenomatous goiters is indicated.

Preoperative preparation with antithyroid substances was successfully accomplished in all cases. Toxic reactions to these drugs, especially propylthiouracil, were relatively infrequent; however, careful observation is necessary for all patients receiving these drugs.

Subtotal thyroidectomy was carried out on all patients, with one postoperative death and with a low morbidity.

In view of the ever-increasing interrelationships between geriatrics and the many social problems arising in connection with our older citizens, the editors of GERIATRICS have felt a pressing need to include within the scope of the journal those social aspects which have direct bearing upon geriatrics in medical practice.

A new section of the journal devoted to sociomedical aspects of geriatrics, will be instituted with the January-February issue next year. THE ESSENTIAL PARTNERSHIP OF MEDICINE AND SOCIAL WORK IN GERIATRICS by Ollie A. Randall, consultant on services for the aged for the Community Service Society of New York, will be the leading article.

Intestinal Obstruction In the Aged

L. Kraeer Ferguson, M.D.,*
Delbert C. Smith, M.D.,† *and Paul C. Houston,* M.D.†

MUCH HAS BEEN WRITTEN on the subject of intestinal obstruction but when the high mortality still associated with this condition is considered,[1] especially in the aged patient,[2] further attempts in any direction to bring about better results seem worthwhile and certainly not out of order.

Readers of *Geriatrics* do not need to be reminded of the gradual shift of the age composition of the population to higher age levels. Not only do such causes for intestinal obstruction as carcinoma and hernia become more frequent in the aged, but the operative risk in the latter decades of life is increased, thus adding significance to the problem. Obstruction to the normal flow of the gastrointestinal tract content is a symptom of an underlying primary cause. If the condition is diagnosed early and treated rationally the results should be uniformly favorable. This is far from a true picture of the present situation.

During a five-year period, January 1, 1944 to December 31, 1948, inclusive, there were 109,979 new admissions to the Philadelphia General Hospital of which 210 (0.19 per cent) were patients 60 years of age or older suffering from intestinal obstruction (Figure 1). Of these 210 patients, 167 were operated upon with 75 deaths, a 44.9 per cent mortality. The remaining 43 patients were not operated upon, five of these survived, the obstruction being relieved by non-surgical means, and 38 succumbed because they were never considered to be in condition to withstand a surgical procedure of any type. This gives a total of 113 deaths, representing an overall mortality of 53.8 per cent. It is interesting to note that there was an operative mortality of 76 per cent in the 54 cases due to malignancy as compared to a 30 per cent mortality in the 113 cases of non-malignant obstruction.

In the analysis of this almost unbelievably high mortality, one must keep in mind that 38, or 18 per cent, of the 210 patients, 60 years of age or over, admitted with intestinal obstruction, were in a moribund condition when first seen and all of those died within a few hours. The attending physicians cannot be responsible for this segment of the mortality. Shading off from this first group is a second large group of seriously ill patients in whom it was felt that operation, although the risk was extremely poor, would give their only hope for survival. This great delay by the patient in seeking medi-

*Read before the meeting of the American Geriatrics Society held in Atlantic City, N. J., June 2-4, 1949.

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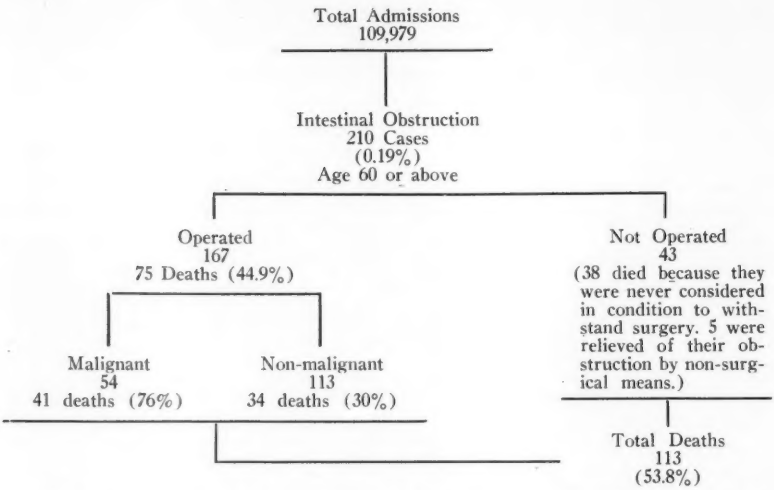

Fig. 1—Analysis of cases of intestinal obstruction, in patients 60 years of age or older, admitted to the Philadelphia General Hospital over a 5-year period, January 1, 1944 to December 31, 1948, inclusive.

cal attention appears to be the largest single factor in maintaining the still high mortality associated with intestinal obstruction in this particular hospital.

To further emphasize the magnitude of this problem, we reviewed 20,000 consecutive autopsies done in the same institution covering a 10-2/3 years

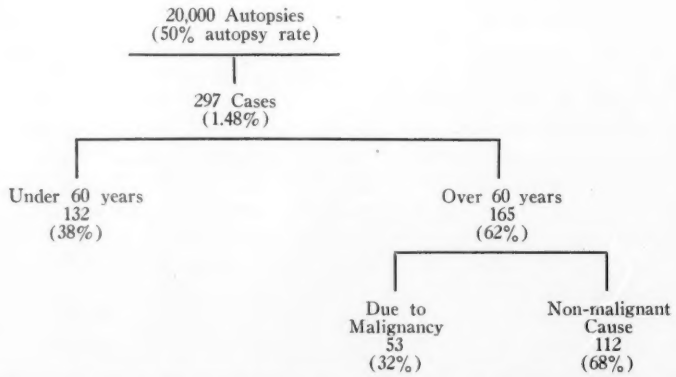

Fig. 2—Analysis of 297 cases dying of intestinal obstruction found in 20,000 consecutive autopsies at the Philadelphia General Hospital covering a 10-2/3 years period.

period between October 21, 1937 and May 12, 1948 (Figure 2). During this interim there was an average hospital autopsy rate of 50 per cent. In this series of autopsies there were 297 (1.48 per cent) patients dying primarily of intestinal obstruction. In other words, since 50 per cent of the patients dying in this hospital came to autopsy, one can roughly assume that a similar number among the nonautopsied patients died of the same condition and, therefore, 1.48 per cent of all deaths in this institution were a result of intestinal obstruction. Of these 297 cases dying as a result of obstruction, 132 (38 per cent) were under 60 years of age and 165 (62 per cent) were 60 years of age or above.

These statistics from a large public hospital are quoted primarily to stress the importance and seriousness of the problem of intestinal obstruction in the elderly. The remaining remarks will be devoted to the factors pertinent to the problem in the latter decades of life.

ETIOLOGY

THE process of growing old leads to many changes, both physiologic and pathologic, which predispose to various types of interference with intestinal flow.

The physiologic changes seen in advancing age have to do in part with a gradually decreasing effectiveness of peristaltic activity. This is overcome in many cases by the daily ingestion of gradually increasing doses of cathartics or the frequent use of enemas. It is not uncommon, however, for incomplete evacuation to result in retention and inspissation of fecal material with the production of fecal impaction. The presence of an impaction, which may be as large as a grapefruit, usually produces a feeling of discomfort in the pelvis. Frequently small liquid stools are passed, which are really fecal-stained mucus. The increased mucus is formed as a result of irritation of the mucosa by the impacted fecal mass. Distention, nausea and vomiting, and crampy abdominal pains all may appear.

By digital examination of the lower rectum, the obstructing fecal mass can be easily recognized. Nothing is so effective as digital morcelation of the impaction, followed by enemas. It may be necessary to repeat the process several times before a large impaction is completely relieved.

A SECOND physiologic change having to do with peristaltic activity concerns the response of the older patient to trauma. The trauma may be operative, but more often may be a fall, fracture, or many other injuries having nothing to do with the abdomen. Secondary to such trauma peristalsis appears to become ineffective and the abdomen becomes distended with gas-filled loops of both small and large gut, and often stomach. The gas is usually air, swallowed in abnormal amounts by a patient distressed with pain. Peristalsis is usually present but in reduced amounts, and is characterized by high-pitched tinkles of distended intestinal loops. Vomiting produces a loss of fluid and electrolyte, so that a relatively innocent injury in a young

individual may result in a serious physiologic disturbance in an older individual. Although the problem begins as a disturbance of a physiologic mechanism, it can rarely be solved by the physiologic action of such drugs as pitressin or prostigmine. Once distention occurs, the problem becomes a mechanical one, and its solution depends upon decompression of the stomach and intestines by intubation from above and enemas from below. Once the gut has been decompressed, rapid recovery takes place.

A THIRD change which may be looked upon as physiologic, but which results in pathologic disturbances is the tendency for the older individual to lose fat. This loss of fat from the tissues forming the abdominal cavity produces hernial orifices where none had been present before. The most striking example of this process is seen in the region of the femoral canal. The absorption of the fat deposit which normally fills the canal leaves a potential space into which the peritoneum covering the femoral ring is forced or drawn. The femoral ring thus becomes a hernial orifice which frequently is so small that only a portion of the intestinal wall can enter it. A Richter's type of hernia is thus produced. This effectively obstructs intestinal flow, but the blood supply of only a small portion of the intestinal wall is impaired. The same type of change also occurs in the inguinal canal.

The diagnosis of these hernias is difficult because there are often no local signs such as a mass or local tenderness to indicate the nature of the process. Even at operation with the diagnosis made it is often impossible to palpate a strangulated Richter's hernia in the femoral or inguinal rings. The importance of hernia as a cause of intestinal obstruction will be seen from the fact that 48 per cent of 210 cases of intestinal obstruction were due to some form of hernia.

THE development of a hernia may be the manifestation of an underlying primary disease in the respiratory system. Not infrequently will hernias be forced through narrow openings after a bout of coughing. In this older age group, where chronic respiratory infections and bronchogenic carcinoma are more common, a search for pulmonary pathology should be made if the history is at all suggestive.

The pathologic change seen with advancing age is predominantly malignancy. Since intestinal malignancy as a primary process is almost invariably of the large gut, it may be said that carcinoma of the colon is the chief pathologic change producing intestinal obstruction in the older individual. In this series 64, or 86.5 per cent, of the total of 74 cases of large bowel obstruction were due to carcinoma.

Although the various previously mentioned forms of nervous imbalance and also mesenteric vascular occlusion can produce a cessation of intestinal flow which must always be considered in the differential diagnosis of intestinal obstruction, only those causes of a true mechanical nature amenable to surgical correction have been tabulated in this series. Reference to table I

TABLE I

ETIOLOGY OF 210 CASES OF INTESTINAL OBSTRUCTION IN PATIENTS OVER 60

	Small bowel		Large bowel	Total
Femoral hernia	46		0	46
Inguinal hernia	41		2	43
Umbilical hernia	8	101	1	9
Incisional hernia	6		0	6
Adhesions	20		0	20
Intussusception	4		1	5
Volvulus	4		2	6
Tuberculosis	0		1	1
Diverticulitis	0		2	2
Fecal impaction	0		1	1
Malignancy	7		64	71
Total	136		74	210

shows that of 210 cases of intestinal obstruction 136 were in the small bowel level and 74 in the large bowel. Of the small bowel obstruction 101, approximately three-fourths, were due to various forms of external hernia. Twenty of the remaining 35 were due to adhesions. Thus, a very small percentage of small bowel obstructions in the elderly are due to causes other than hernia or adhesions, 11.1 per cent in this series. Malignancy, either primary or secondary, caused only 5.1 per cent.

TABLE II

MORTALITY IN 210 CASES OF INTESTINAL OBSTRUCTION IN PATIENTS OVER 60

	—Operative—		—Non-operative—	
	Number of cases	Deaths	Number of cases	Deaths
Femoral hernia	42	12	4	4
Inguinal hernia	36	5	7	4
Umbilical hernia	8	1	1	1
Incisional hernia	4	4	2	1
Adhesions	15	7	5	5
Intussusception	3	1	2	2
Volvulus	3	3	3	3
Tuberculosis	0	0	1	1
Diverticulitis	2	1	0	0
Fecal impaction	0	0	1	1
Malignancy	54	41	17	16
Total	167	75	43	38

DIAGNOSIS

THE importance of making an early diagnosis in intestinal obstruction cannot be overemphasized. As already pointed out, the delay in seeking medical attention placed 18 per cent of the patients in this series beyond the hope of surgical aid at the time of admission to the hospital. Valuable time can

be saved by the astute general practitioner who recognizes the symptoms of intestinal obstruction and promptly expedites surgery. Elderly patients have less physical reserve and appear to tolerate an obstruction with less stamina than younger individuals. It, therefore, becomes even more important to recognize the condition as soon as possible.

The sluggish bowel habit, so often seen in the older group patient, can be a confusing issue in the early course of the disease. Relatives, and the patient himself, may be reluctant to seek medical advice since his symptoms are thought to be further difficulties with his usual constipation. The older individual appears to have less pain associated with comparable lesions than does the younger patient—reconfirming what has been said for many years that "the organs of the aged suffer in silence." As individuals grow older they appear to have less people interested in them. They are expected by their friends and relatives to have more aches and pains, and, therefore, little attention is paid to the appearance of a new complaint until the disease is well progressed. All of these factors appear to be logical explanations for the delay so frequently seen in the diagnosis of obstruction in the elderly.

After a careful history and physical examination, the diagnosis of obstruction can frequently be made at the bedside without x-ray or laboratory aid. The cardinal symptoms are those of colicky abdominal pain, vomiting and a change in bowel habit. By careful inquiry, strong evidence may be obtained to support the diagnosis of either small or large bowel obstruction. The rather sudden onset of severe colicky pain followed soon by vomiting is very suggestive of small bowel obstruction. On the other hand, distention with colicky pain and little or no vomiting suggests the presence of large bowel obstruction. As a general rule, the higher the obstruction the less the distention and the earlier the vomiting. Usually the reverse is also true, the lower the obstruction the more the distention and the vomiting occurs late if at all. It must be remembered that in obstructions of the colon, distention of the small gut comes on late if the ileocecal valve is competent.

Vomiting may occur when the small gut fills up with a collection of retained stomach secretions or as reflex action or symptom of peritoneal irritation, and so is not always a too reliable symptom in attempting to distinguish between large and small bowel obstruction.

Attempts to localize the site of obstruction from the location of the colicky pain are suggestive but not diagnostic. Constant pain with localized tenderness suggests strangulation in small gut obstructions, but in many older patients a strangulation of a Richter's hernia gives few, if any, localizing signs. Pain and tenderness in large gut obstruction usually signifies a local peritoneal irritation, such as peritonitis from beginning perforation.

Other helpful data which may be obtained from the history include record of previous operations, and the appearance of hernial swellings—both of which suggest the possibility of small gut obstruction. A history of gradually increasing constipation often with alternate attacks of diarrhea, borborygmi,

and the passage of blood and mucus in the stool suggests the presence of a lesion of the left colon, where almost all large bowel obstructions occur.

On physical examination, three findings are helpful in making the diagnosis: distention, auscultatory findings, and tenderness. The degree of distention and its location are significant observations on inspection. The most important findings are those of abdominal auscultation. The high-pitched tinkle characteristic of peristaltic sounds in distended gut are diagnostic. Frequently persistent listening over a considerable period of time or at frequent intervals is necessary before the characteristic sounds are heard, because they occur only at the time of colicky pains, or peristalsis may be reflexly depressed due to strangulation. Tenderness to palpation usually signifies the addition of an inflammatory factor to the intestinal obstruction, either strangulation or peritoneal irritation due to perforation. A rectal examination should always be made although it does not always give significant findings. It may be diagnostic if a rectal carcinoma can be palpated or if blood is found on the examining finger. A proctoscopic examination may supply additional information in many cases.

The most critical diagnostic aid is obtained by roentgen examination which to be most informative must be made in the erect position. This is usually possible even in the very ill patient by the use of the tilting table. By this examination one can usually differentiate between small gut obstruction characterized by multiple gas-filled loops with numerous short fluid levels, and large gut obstruction showing much larger gas-filled loops with longer fluid levels. In some cases, after a survey film has shown large bowel obstruction, a barium enema carefully given will give definitive information as to the site of the lesion.

Should the roentgenogram reveal small bowel obstruction, a second search should be made for a small external hernia which may have been missed on the initial physical examination. If hernia can be excluded, and the patient has had a previous laparotomy, then adhesions should be considered as the cause. One, however, should not feel too chagrined to find a small Richter's type hernia producing the obstruction at the time of laparotomy. A history of a hernia, present at the onset of obstructive symptoms and later disappearing, usually after manual reduction by patient or doctor, suggests the possibility of a hernia reduced en masse. We have seen three such cases during the past year.

One final word of caution. In the presence of a non-reducible hernia, and especially one of recent occurrence, all gastrointestinal symptoms should be attributed to it until proved otherwise by operation. Elderly patients are frequently seen with nausea, vomiting, upper abdominal pain and a so-called coincidental hernia. Although the hernia is the cause of the obstruction it may not be so considered. Local pain and tenderness in the hernia are probably so overshadowed by the predominating gastrointestinal symptoms and by a

reference of the pain to the upper abdomen that patient and doctor are led astray from the primary site of the difficulty.

Since malignancy is a rather infrequent cause of small bowel obstruction, 5.1 per cent in our series, all such obstructions, even in the elderly, should still be considered due to a benign cause. With more and more extensive abdominal surgery being done in the eradication of cancer, we can expect to encounter an increasing number of obstructions due to the resultant adhesions. Even when a patient with a former operation for carcinoma presents a picture of small bowel obstruction, it should still be considered due to a benign cause until proved otherwise. Certainly no such patient should be considered hopeless and beyond surgical aid because of carcinomatosis unless positive evidence is at hand. Also, we must not forget that a resection for secondary carcinoma may add considerably to the length of the patient's life.

As borne out by our series, a very high percentage (86.5 per cent), of large bowel obstructions are due to carcinoma.

PREOPERATIVE MANAGEMENT

Having established the diagnosis of intestinal obstruction, the surgeon is confronted with the problem of safely conducting a patient, often with a multiplicity of degenerative diseases and a reserve already lowered by the acute process, through an operative procedure of considerable magnitude. All the principles applying to the preoperative management of younger individuals with the same disease should be carried out, but with additional stress at certain points where the margin of safety is narrower.

Dehydration and electrolyte imbalance will usually be present, the amount depending upon the site and duration of the obstruction. Early attention should be given to the correction of these most important pathological disturbances. Valuable time can be lost in this regard if the completion of all diagnostic studies is awaited before intravenous fluid and electrolyte administration is begun.

Varying degrees of impaired renal function are encountered in most elderly patients. High levels of azotemia are thus frequently produced by the dehydration encountered in obstruction. Elimination of these products of metabolism can only be brought about by the return of renal output, which in turn depends most successfully upon the early administration of parenteral fluids.

Cardiac reserve is often limited. With present day methods of rapid digitalization available, we should take advantage of this valuable adjunct whenever indicated during the preoperative phase. There are, no doubt, many individuals now being saved through such measures that formerly succumbed to cardiac failure in the postoperative period.

As previously stated, distention is usually in proportion to the duration of the obstruction and varies with the level of the obstruction in the gastro-

intestinal tract. When the patient is seen early in the course of the disease, and no distention is found, no kind of intubation is indicated. Usually, however, there will be some degree of distention and in almost all cases a Levine tube, at least, should be passed to empty the stomach and upper gastrointestinal tract of gas and fluid. This gastric decompression will also decrease the hazard of aspiration of vomitus during the operative procedure. If marked small bowel distention is present, a longer period of time must be devoted to decompression with one of the various types of double lumen tubes. Intubation should play only a minor role in the preparation of a patient suffering from large bowel obstruction, unless there is also present secondary ileal obstruction. The ileocecal valve is competent in a high percentage of cases of large bowel obstruction and a tube, even though passed to the terminal ileum, will not decompress the colon. An emergency surgical procedure decompressing the right side of the large bowel, without loss of valuable time attempting to intubate, is the management of choice.

The optimum time for operation in a case of intestinal obstruction depends upon many factors and the successful outcome frequently rests upon the surgeon's good judgment. If a hernia is known to be the cause, operation should be delayed for as short a period of time as possible. Strangulation is often present and this factor weighs heavily in favor of an emergency procedure, especially when the increased mortality of resection is considered. On the other hand, if a hernia cannot be demonstrated and the obstruction is late, as evidenced by marked distention and imbalance in the blood chemistry, a longer period of preoperative preparation is justified. As a general rule, small bowel obstruction due to any cause, seen early, should be operated upon as soon as possible before gangrene of the bowel or distention sets in.

Once complete, large bowel obstruction can seldom be relieved by other than surgical means. A decompression procedure, usually a cecostomy or a transverse colostomy, is done as soon as fluid and chemical imbalances can be reasonably corrected.

Anemia and vitamin deficiencies are often present and can be corrected to great advantage during the preoperative period.

OPERATIVE CONSIDERATIONS

HAVING made the diagnosis of intestinal obstruction and treated the patient to the optimum degree of physical preparedness, the surgeon must next select the best type of operative procedure. It is imperative that the diagnosis of large or small bowel obstruction be known preoperatively because the choice of surgical methods will depend upon this knowledge.

If a well-trained physician anesthetist is available, the choice of anesthesia is best left to him. There should, however, be a mutual understanding of the problem by surgeon and anesthetist, with caution to envision any possible complications which might prolong the procedure. Release of hernias can usually be done under local anesthesia. Where a non-viable strangulated intestine is contemplated and a more formidable procedure is likely, we have

in some cases inserted a continuous spinal needle preoperatively and refrained from administering any anesthetic agent until it was ascertained that an intra-abdominal procedure was necessary. If the hernia does not contain gangrenous bowel no spinal anesthesia is given. Cyclopropane as the anesthetic agent, supplemented by curare as needed for muscular relaxation, has proven very satisfactory in many cases. Older patients do not tolerate respiratory depressant narcotic drugs well. Preoperative sedation should, therefore, be kept to a minimum.

THE prime consideration, of course, is to relieve the obstruction. This should be accomplished rapidly with as little trauma to the patient as possible. Poor wound healing and evisceration is not an uncommon occurrence in these cases. We have, for this reason, favored lateral muscle splitting and transverse incisions rather than the vertical type. Meticulous care should be given to hemostasis.

The actual type of operative procedure done will vary with each individual problem. Many factors must enter into the final judgment, the decision resulting only after all the facts are known at operation. When resection is necessary, intestinal continuity can usually be restored by primary end to end anastomosis. Even if edema of the bowel wall is present and there is marked discrepancy in the size of proximal and distal segments, primary anastomosis is performed. A small gut fistula is avoided if at all possible because of the difficulty encountered in maintaining electrolyte balance postoperatively in these older patients. Since the first objective is to relieve the obstruction, at times a simple tube enterostomy must be performed, leaving definitive surgery till the patient is in better condition.

Complete decompression of an obstructed large bowel is not uniformly obtained through a cecostomy. A single loop colostomy of the proximal transverse colon following the technique of Wangensteen[3] is an excellent method of dealing with such cases. This method is simple, relatively atraumatic, gives complete diversion of the fecal stream and decompression can be obtained immediately.

Should advanced malignancy be encountered and radical surgery, even at a later date, be out of question, one should select the procedure which will give the greatest degree of palliation. Relief of pain is most important. Shunting anastomosis and palliative colostomies may add many comfortable weeks or even months to a patient's life.

POSTOPERATIVE CARE

CONVALESCENCE can be aided tremendously in these older individuals by an optimistic environment created by the combined efforts of physician, nurse and relatives. His confidence should be gained and his part in the recovery program explained—deep breathing, expectoration of mucus, and frequent movement of toes and legs. Getting a patient up as soon as possible after operation frequently does much for his morale because it convinces him he

is getting well. Early ambulation is of greatest importance in preventing pulmonary complications. On the other hand, fatigue due to long periods out of bed must be avoided.

Tubes should be removed as soon as they have served their purpose, since their prolonged use gives rise to pulmonary complications. When peristalsis and the passage of flatus on the second or third postoperative day indicates that gastrointestinal function has been restored, the suction tube can be removed. Oral feedings may be delayed in some instances another twenty-four hours for safety.

Overhydration is to be strictly avoided, and we prefer to keep these individuals slightly on the dry side. Elderly patients with a poor cardiac reserve do not tolerate large amounts of fluid added suddenly to their circulating blood volume. This must be kept in mind and intravenous infusions should be given very slowly.

BECAUSE of the high incidence of pulmonary complications associated with most operative procedures in the elderly, prophylactic penicillin therapy seems indicated. Streptomycin should be given where there is a chance of peritonitis, either from contamination during a resection or from direct transmission of organism through a more permeable bowel as a result of distention.

The elderly male patient frequently has difficulty in voiding. Watch must be kept for this contingency and/or overdistention of the bladder. Should there be a degree of obstruction, an indwelling catheter is probably the better solution for a few days. When the patient is again ambulatory this troublesome complication will usually disappear. Small amounts of sulfadiazine should be given daily until normal urinary flow returns.

Because wounds in the elderly heal slowly, it is our policy to leave sutures in slightly longer than in younger individuals. We prefer to rely on a well-sutured wound, using stainless steel wire for fascia and retention sutures, then applying an abdominal binder, which, through upward pressure on the under surface of the diaphragm, may retard the development of pulmonary complications.

Too much emphasis cannot be placed upon the nursing care of these patients which is probably the most important item in the entire post-operative therapeutic armamentarium. Frequent turning and straightening of wrinkled sheets will do much to prevent decubitus areas. Attention to the care of the mouth may prevent a severe parotitis and thus revert a near fatal outcome to a successful one.

COMMENT

OBSTRUCTION of the intestinal flow is a physiologic disturbance which frequently arises during the process of growing old. It is poorly tolerated in the older patient, and its successful treatment depends upon the early recognition of its signs and symptoms. Prompt surgical relief of the obstruction, careful pre- and postoperative care, skilled anesthesia administration,

are measures which together give excellent results even in the latter decades of life.

SUMMARY

1. The magnitude of the problem of intestinal obstruction in the aged has been stressed.
2. Hernia, in its many varieties, is by far the chief cause of small bowel obstruction. Large bowel obstruction, in the majority of cases, is due to carcinoma.
3. The diagnosis of obstruction is frequently made after a history and physical examination, but where the diagnosis is obscure, a roentgenological scout film of the abdomen and an occasional barium enema study will aid tremendously, and give information as to the site of the obstruction. Obstructions should be divided into large and small bowel types preoperatively, since the plan of therapeutic attack is so different.
4. Once the diagnosis is made, operation should be delayed only until the optimum state of physical preparedness is reached. Additional haste is indicated when strangulation may be a factor.
5. Good surgical judgment must be exercised to select the operative procedure of choice for each situation.
6. The establishment of an optimistic outlook, early ambulation, and good nursing care are the most important therapeutic items during the postoperative period.

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*Workers Are Living Longer**

The life expectancy of the worker in the United States has increased by about two years since the end of the war. In 1948 the average was over 67 years. An industrial worker at the age of 24 has approximately the same number of years ahead of him as a baby had at birth a generation ago. The length of the life of the Negro population lags considerably behind that of the white population until the age of 65 when the two are very nearly the same, and the females of both races have an advantage of several years over the males.

*Postwar Rise in Longevity of Industrial Population, Stat. Bulletin Met. Life Ins. Co. 30: 1-3, 1949.

Gynecological Conditions Found In Older Women

Mary DeWitt Pettit, M.D., F.A.C.S.†

FOUR general types of complaints are apt to bring older women to the gynecologist:

(1) Vaginal discharge plus or minus frank bleeding. The public has come to associate these symptoms with cancer and as times goes on, an increasing number of patients in the post menopausal group are presenting themselves promptly with minimal spotting.

(2) Abnormal discharge which may or may not be associated with pruritus, or itching alone.

(3) Frequent or painful urination alone or associated with the above symptoms.

(4) A mass, vulvar, vaginal, abdominal, or in the breast.

Uterine bleeding in a woman who has passed the climacteric must never be ignored, even though it seems minimal. Many atrophic cervices are stenotic. It is necessary that considerable pressure of secretions be built up inside such a uterus before the cervix will let through the bloody discharge from an intrauterine carcinoma. It must be remembered that the uterus with an early corpus cancer may not be enlarged and the cervix may appear normal. Wherever a definite history of bleeding is obtained or wherever bloody discharge can be seen extruded through the external os, a diagnostic curettage is the only safe procedure. Cytologic smear, the gelatin sponge biopsy, the Clark test, etc., may be helpful but give only presumptive evidence.

Blood-tinged discharge due to vaginitis may be difficult for the patient herself to differentiate from frank bleeding. Examination of the vaginal and cervical secretions by culture for bacteria and monilia, by hanging drop for trichomonas vaginalis vaginitis, can easily rule out such etiology. The acrid, frothy, pinkish discharge due to the latter is very characteristic. The atrophic vaginal epithelium resists infection poorly for several reasons. Because of diminished glycogen deposition in the tissues and lessened lactic acid formation due to diminished estrogenic activity, the pH of the vagina in postmenopausal women changes from the normal acid pH of 4 to an alkaline pH of 7 to 8. The lactic acid producing organisms of the normal flora are absent from such vaginae. In senile vaginitis, cultures will show all sorts of pathogens—usually, of course, the colon group. If small breaks in the atrophic mucosa admit these organisms to the deeper layers, a low grade,

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rather resistant vaginitis is produced. Therapy must be directed at re-establishment of normal pH and estrogenic hormone may be helpful in restoring a more active epithelium to favor healing. The atrophy will reappear when the hormone is discontinued but if the infection is gone, the patient will be asymptomatic.

Bleeding may occur from a decubitus ulcer on a prolapsed cervix and cause the patient considerable alarm. Due to the prolapsus, such a cervix is edematous, engorged and cornified; true ulcer formation occurs and this will not heal until the prolapse is corrected. These ulcers very rarely become malignant. Correction of the circulatory difficulty due to the prolapse will result in prompt healing of the ulcer. Bleeding from benign cervical polypi, from urethral caruncle, from hemorrhoids may confuse the picture—carcinoma of the cervix uteri is less common than that of the corpus in these older women but must, of course, be kept in mind.

The second group, that of pruritus ani and pruritus vulvae, is often very difficult to handle. The specific local causes such as pediculosis, fungus infection of skin and other dermatoses, trichomonas or monilia vaginitis will yield to specific therapy for these infestations. As mentioned above, the use of chemical agents to combat the vaginal flagellates or fungi may need the addition of estrogenic hormone to completely throw off the infestation. Consultation with a dermatologist in cases of eczema, lichen planus, psoriasis and fungous infection of the skin is advisable as it is very easy to overtreat them and add a chemical irritation to the difficulty. One must always think of the general systemic causes of pruritus such as diabetes mellitus, vitamin deficiency (especially that of vitamins A and B), anemia, leukemia, and allergies to food and drugs. It has been estimated that this last group comprises only about 10 per cent of the total number of cases of pruritus vulvae.[1] Another 15 per cent will fall into the group of lichen sclerosus et atrophicus, kraurosis vulvae with or without leukoplakia, and the simple senile vulvitis. The lichen sclerosus et atrophicus bears no relation to the menopause but may be noticed first at that time, is often characterized by extragenital as well as genital lesions. Biopsy will make this diagnosis and cure is difficult.

Kraurosis vulvae is a definite postmenopausal syndrome with the final picture of atrophic whitened patches with which we are all familiar. This condition must be observed carefully for evidence of leukoplakia which is often superimposed on the thinned out areas as thickened white plaques. These are definitely precancerous lesions and when the diagnosis is certain, vulvectomy is advised. One difficulty is that the disease may recur in skin adjacent to the operated area.[2] Patients will, in selected cases, have complete relief of itching from surgical excision of the affected tissue. Because of the danger of malignancy in kraurosis and leukoplakia, alcohol injection is not advised. Large doses of vitamin A are now being used with hopeful results.[3]

Senile pruritus, which was discussed above, will respond very well to hormone therapy, local or by mouth. The largest and most difficult group

to treat is that where the neurogenic factor is marked. About 75 per cent of the total will fall into this category. The scratch-itch-scratch cycle is very difficult to interrupt. It may be paroxysmal or almost continuous, very often is most intense when the patient is ready for sleep. Worry, fatigue, financial insecurity, etc., form the background for this syndrome. Very few local changes are visible except thickening of skin and irritation produced by scratching. Emollient lotions, increased rest and vitamins, judicious sedation and even bed rest are necessary at times to break into this cycle. Renewed stress will often bring recurrence of this difficulty. The gynecologist can best contribute to the problem by careful elimination of local lesions, reassurance of the cancerophobic patient and a careful endocrine evaluation. Vulvectomy may be necessary in selected cases and biopsy is very helpful in differential diagnosis.

After cessation of ovarian activity, the pelvic supports become atrophic, elasticity is much reduced and sagging of all the tissues occurs. Stress incontinence of urine due to weakness of the vesical sphincter is apt to make its appearance. The capacity of the bladder is reduced and frequent emptying becomes a necessity. When lacerations due to childbirth are present, cystocele, urethrocele, enterocele and rectocele become more marked. Prolapsus which has previously been minimal now becomes progressively worse with protrusion of part or the whole of the uterus on straining, coughing or standing. When the bladder empties incompletely the residual urine becomes easily infected. Cystitis will then cause acute symptoms and bring in the patient who may not have previously noticed her cystocele. This infection will be difficult to eliminate permanently unless the mechanical defect of the cystocele is corrected. With the modern armamentarium of chemotherapy, antibiotics, blood transfusion and modern anesthesiology, unless the patient is a very bad surgical risk, the use of pessaries as a permanent treatment is to be condemned. Relaxations of the bladder plus prolapsus are progressive lesions and if the patient lives long enough, the time will come when no pessary will correct the situation. By that time, the patient is often in much worse general physical condition for operation. Careful selection among the available operative techniques will render these patients comfortable with the danger of complications now reduced to a legitimate hazard. Early ambulation within 24 hours of operation has made this possible. Bladder irrigation and instillation of mild silver protein solution is still very helpful in relieving symptoms due to low grade trigonitis so common in these elderly bladders.

The complaint of finding a mass made by postmenopausal patients may be due to cystocele, prolapse or a true tumor in any of the various possible locations. Many patients will be certain that they have cancer when a prolapsed organ starts to appear at the introitus.

A mass in the vulvar region may be due to inguinal hernia, sebaceous cyst, Bartholin's cyst, an inflammatory mass from superimposed infection

in a cyst or true tumor. Epithelioma of the vulva may be asymptomatic, may cause itching especially if superimposed on a leukoplakic vulvitis. This is almost never painful until ulceration and secondary infection have occurred. Suspicious warty growths and all pigmented moles should be widely excised rather than biopsied. Carcinoma of the vulva is usually squamous cell carcinoma, although adenocarcinoma does occur in Bartholin's glands and sweat glands. In older individuals, epithelioma may cause extension relatively late. Wide vulvectomy and excision of regional lymph nodes is the treatment of choice.[4] If the patient is a poor operative risk, this may be done in two or more stages.

Cancer of the cervix and cancer of the body of the uterus must be treated as indicated in each individual case. Elderly individuals irradiated with tumor lethal dosage must be watched carefully for fall in red blood count and white blood count. These patients are apt to have severe nausea and vomiting, may have hypoproteinemia and avitaminosis to start with. Supportive therapy with vitamins, antihistaminics, etc., and blood transfusion is particularly important in this group.

In carcinoma of the corpus uteri, panhysterectomy, bilateral salpingo-oophorectomy must be done if the patient is even a reasonable risk. This is usually preceded by intracavitary radium insertion. Following irradiation, viable tumor will be found in the removed uterus in about 50 per cent of cases. If irradiation alone is all that can be given safely to a poor risk, a combination of intracavitary radium application and deep x-ray therapy is advised.

Ovarian neoplasms are not uncommon in elderly individuals. Benign cystadenomata may reach the size of a term pregnancy and one does not know when malignant change will start. The usual story is that the patient has noted an abdominal mass which has increased in size in a period of months. If no ascites is present or if examination fails to reveal implants of tumor in the cul-de-sac of Douglas (rectal shelf) or in the omentum (omental cake), one has a good chance of finding that the tumor is benign. Once a malignant tumor has penetrated the ovarian capsule or has extended to the other ovary, the prognosis becomes discouraging. Removal of the primary growth if possible will give a better prognosis in regard to the metastasis. High voltage x-ray therapy is of definite palliative help.

Lumps in the breast are not infrequently discovered in the older age group and when they occur should be considered malignant until proven otherwise. Radical mastectomy is the treatment of choice where possible in all breast cancer. In the face of serious systemic disease, when ulceration of the breast is feared, a palliative mastectomy may be done even in a very bad risk. This will make the patient more comfortable and reduce the difficulty of good nursing care. Irradiation and the use of testosterone have much palliative value, especially in bone metastasis.

SUMMARY

In conclusion an attempt has been made to outline the most frequent conditions which bring the geriatric patient to the gynecologist. The important causes for such symptoms as postmenopausal bleeding, discharge, itching, abnormal mass and urinary disturbance have been listed and general therapeutic considerations mentioned. Unfortunately the scope of this paper does not permit a detailed discussion of therapy.

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*Acute Rheumatic Fever in the Aged**

David H. Appelman, M.D.,
Morris S. Feiman, M.D., *and Louis Harris*, M.D.

Initial attacks of rheumatic fever, usually confined to childhood, may also occur rarely in the latter decades of life. David H. Appelman, M.D., Morris S. Feiman, M.D., and Louis Harris, M.D., report the case of a woman who showed first symptoms of the disease at the age of 65.

Persistence in involvement of small joints or in cardiac complications, both features of rheumatoid arthritis or chronic secondary infectious arthritis, was lacking.

Clinical picture was typical, including generalized joint involvement, fever, leucocytosis, markedly prolonged P-R interval, rapid sedimentation rate, and persistently high elevation of antifibrinolysin titer. Response to salicylate treatment was excellent.

Absence of previous heart disease or joint pains, combined with secondary anemia, heart murmurs and abnormalities in electrocardiograms, all disappearing with recovery, contribute to the diagnosis despite advanced age of the patient.

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Interrelationship Among the Vitamins in the Aged*

Henry A. Rafsky, M.D., F.A.C.P.,†
and Bernard Newman, B.S., CH.E., M.S.‡

IN PREVIOUS reports, we have published the results of the studies of vitamin A,[1,2] carotene,[1,2] thiamine,[3,4] and ascorbic acid[5] in the aged. As a result of these investigations it was observed that a state of "biochemical avitaminosis" exists in apparently normal elderly subjects. This may be defined as laboratory evidence of deficiency disease without clinical signs or symptoms of it. In these studies, which were performed at different times, the individual was investigated as to the status of a single vitamin. It was, therefore, thought of interest to study the vitamin levels of ascorbic acid, thiamin, vitamin A, carotene, nicotinic acid and riboflavin in the same subject at the same time and also to determine the degree of correlation, if any, which exists among the vitamins in aged subjects. To the best of our knowledge the results of such a study have not previously been reported.

EXPERIMENTAL

THIS study was based on a series of 38 apparently normal aged persons with an age range from 65 to 86 years. All of the subjects were ambulatory and were on the usual institutional dietary regimen which was shown to be adequate in vitamins and iron content in healthy young adults according to the recommendations of the National Research Council. The blood levels of ascorbic acid were determined by the Tillman titration procedure,[7] and those of vitamin A and carotene by the method of Dann and Evelyn as modified by the United States Army Manual for the use of the Coleman Spectrophotometer.[8] Urinary excretions of thiamin were determined by the method of Hennessy and Cerecedo,[9] the excretion of nicotinic acid by the procedure of Perlzweig[10] and the level of excretion of riboflavin by the fluorescence method of Arnold.[11] All the urinary excretion levels were determined on the same 24-hour specimen of urine which was preserved with 25 cc. of toluol and refrigerated during the collection period until assayed. All of the blood determinations were performed on blood collected with the patient in the fasting state during the same 24-hour period that the urine was collected. The plasma was drawn from oxalated blood for ascorbic acid, while serum was used for the determination of carotene and vitamin A.

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TABLE I

Case	Age	Sex	Carotene γ/100 cc.	Vitamin A γ/100 cc.	Vitamin C mg./100 cc.	Vitamin B_1 γ/day	Ribo. mg./day	Nic. Acid mg./day
1	78	f	42	14	0.84	201	0.6	9.4
2	70	f	24	5	1.40	136	0.8	15.6
3	65	f	84	30	0.64	83	0.8	10.0
4	81	f	78	15	0.84	72	0.6	8.0
5	80	f	108	11	0.19	80	0.5	8.9
6	68	f	110	30	0.84	42	1.4	9.7
7	76	f	48	28	1.2	70	0.4	4.6
8	74	f	170	38	1.2	86	1.3	17.7
9	68	m	58	24	1.3	49	1.1	10.8
10	70	m	42	6	0.20	72	0.7	8.8
11	83	m	50	9	0.94	99	0.6	8.4
12	77	f	168	29	0.12	77	1.3	13.4
13	77	f	92	22	0.10	59	0.5	7.8
14	84	f	48	9	0.59	67	0.8	15.1
15	62	m	20	19	0.59	18	0.8	10.1
16	68	f	132	17	0.94	150	1.7	14.7
17	82	f	130	21	0.19	182	0.9	14.0
18	65	f	192	27	0.48	58	0.4	7.8
19	67	f	26	7	1.45	22	1.0	9.4
20	75	f	64	55	0.48	85	1.7	11.5
21	80	m	34	9	3.3	147	0.2	3.2
22	80	m	35	7.0	1.28	32	0.8	7.4
23	76	m	132	22	0.49	100	1.1	10.9
24	86	f	92	20	1.18	41	0.8	7.8
25	83	m	151	27	0.13	30	0.8	6.2
26	80	f	58	11	0.10	120	0.4	7.9
27	70	f	92	21	0.46	144	0.9	4.7
28	75	m	140	17	0.59	150	0.9	9.8
29	82	m	166	42	.....	30	0.6	6.8
30	72	m	50	21	0.60	240	0.3	7.8
31	80	m	114	9	2.5	65	0.9	11.0
32	80	f	40	19	2.2	170	0.8	10.0
33	69	f	166	22	2.0	240	0.9	19.3
34	72	m	100	28	0.20	55	0.7	6.5
35	78	f	140	23	0.18	80	0.4	4.2
36	85	m	92	43	0.37	120	0.9	14.1
37	71	m	106	60	2.2	50	0.6	4.3
38	75	m	40	25	0.18	60	0.5	4.7

NORMALS

Carotene	over	100γ/100 cc.
Vitamin A	over	20γ/100 cc.
Vitamin C	over	0.65 mg./100 cc.
Vitamin B_1	over	100γ/day
Riboflavin	over	0.3 mg./day
Nicotinic Acid	over	3 mg./day

RESULTS

In TABLE I are shown the blood and urinary levels of the various vitamins, together with the age and sex of the subjects investigated. No significant difference was found between the levels for males and those for females.

In the majority of the subjects, subnormal levels of vitamin A or carotene or thiamin or ascorbic acid were found. The daily urinary excretion of riboflavin was below normal in 2 per cent of the individuals and nicotinic acid was within normal limits in all the subjects under study. No definite relationship appeared to exist as to the levels of the vitamins. A statistical analysis of the data presented in table II showed that in 8 of the 38 subjects,

or 21 per cent, only one of the vitamins alone was subnormal as follows: thiamin in 4 cases, carotene in one, vitamin A in one and ascorbic acid in 2 cases. In 16 individuals or 42.1 per cent, two of the vitamins were low as follows: carotene and vitamin A in 3 individuals, carotene and ascorbic acid in 2, carotene and thiamin in 4, vitamin A and ascorbic acid in one, vitamin A and thiamin in one, ascorbic acid and thiamin in 5 subjects. In 10 subjects or 26.3 per cent, three of the vitamins were below normal as follows: carotene, vitamin A and thiamin in 4; ascorbic acid, vitamin A, and thiamin in one; carotene, ascorbic acid and thiamin in 3; carotene, vitamin A and riboflavin in one; carotene, vitamin A and ascorbic acid in one. Vitamin A, carotene, thiamin and ascorbic acid were below normal in 3 or .8 per cent of

TABLE II

SUBJECTS SHOWING LABORATORY EVIDENCE OF DEFICIENCY STATE IN ONE OR MORE VITAMINS

Number of Vitamins (subnormal)	Number of Cases	Percentage of Cases
0	1	2.7
1	7	18.5
2	16	42.1
3	10	26.3
4	4	10.5
5	0	0
6	0	0
		100.0

the subjects. In none of the individuals in this study was there laboratory evidence of deficiency in all of the vitamins. In one individual, no laboratory evidence of avitaminosis was found, as all the vitamin levels were within normal limits. In 30 of the 38 subjects or 79 per cent, thiamin and ascorbic acid were found to be more often subnormal than the other victims. (Table III)

TABLE III

NUMBER AND PERCENTAGE OF SUBJECTS SHOWING DEFICIENCY IN VARIOUS VITAMINS

Vitamin	Number Subnormal	Percentage of Cases
Carotene	23	57
Vitamin A	17	43
Ascorbic Acid	18	47
Thiamin	25	68
Riboflavin	1	2.5
Nicotinic Acid	0	0

DISCUSSION

THE concept that avitaminosis is multiple has been generally accepted even though the patient presents clinical evidence of deficiency in only one vitamin. When one reviews the literature on the subject, however, it is readily apparent that this idea is based on clinical and not laboratory data. To the best of our knowledge, no report has been published in which ascorbic acid, thiamin, nicotinic acid, riboflavin, vitamin A and carotene have been investigated in the same individual at the same time. It was, therefore, of interest

to note that in this study there was laboratory evidence of a single vitamin deficiency in 21 per cent, in two of the vitamins in 42.1 per cent and four of the vitamins were subnormal in 10.5 per cent of the subjects.

It was also significant that in studying the deficiency pattern, no relationship was found to exist among the vitamins. The fact that laboratory evidence of a deficiency in one of the water- or fat-soluble vitamins was found did not indicate that the other water- or fat-soluble vitamins were subnormal. Furthermore in this study a deficiency in one of the components of the B complex did not necessarily mean that the other members of this group were subnormal.

It must be borne in mind that these studies were made in apparently normal aged subjects. It would be interesting to ascertain the laboratory data in a somewhat similar study as herein described in patients with clinical evidence of deficiency disease.

SUMMARY

1. In apparently normal aged subjects no relationship was found to exist between the vitamin levels, in either the fat- or water-soluble vitamins which were studied.
2. In 21 per cent of the subjects, there was laboratory evidence of single vitamin deficiency.
3. In 42 per cent of the subjects there was laboratory evidence of deficiency in two of the vitamins.
4. Laboratory evidence of a complete avitaminosis in all of the vitamins was not found in any of the subjects.

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Gastric Ulcers in the Aged*

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PEPTIC ULCER, especially benign gastric ulcer[7], is not infrequently observed in individuals past the age of 65. Of 450 patients with benign gastric ulcer seen at the University of Chicago Clinics since 1936, 41, or approximately 10 per cent, were in this age group. The purpose of this paper is to review the clinical features and course of the disease in this series, with particular reference to its natural history and to the problem of differentiation from gastric malignancy.

AGE AND SEX DISTRIBUTION

THE series is composed of 25 males and 16 females, a ratio of approximately 1.5:1, almost identical with that reported by Rafsky, et al[6] (Table I). Twenty-seven patients were between the ages of 65 and 69; 8 between 70 and 74; 6 between 75 and 79; and 1 was 82.

TABLE I
AGE AND SEX DISTRIBUTION*

Age Years	Male	Female	Total
65-69	15	12	27
70-74	6	2	8
75-79	4	1	5
80-84	0	1	1
Total	25	16	41

*For 41 patients.

DURATION OF SYMPTOMS

The symptoms were of less than one year's duration in 11 patients, and less than six months in 10; of the latter, 6 had symptoms less than six weeks (Table II). The duration of symptoms in the remaining 30 cases ranged

TABLE II
DURATION OF SYMPTOMS (AT FIRST VISIT)*

Duration (Years)	Males	Females
Less than 1	8	3
1- 4	7	5
5- 9	3	2
10-14	2	2
15-20+	5	4

*For 41 patients.

*Read at the meeting of the American Geriatrics Society, Atlantic City, N. J., June 2-4, 1949.

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from one to 30 years. Nineteen patients (46 per cent) noted their first symptoms after the age of 65; 13 were males and 6 females, a ratio of approximately 2:1. Definite evidence of an old healed duodenal ulcer was found in 9.

ONSET

INITIAL symptoms consisted of abdominal pain in 24, loss of appetite in 7, fullness after eating with nausea and vomiting in 6. In 3 patients the initial symptom was massive hemorrhage; in 1 patient with no symptoms the lesion was discovered during a routine x-ray examination.

SYMPTOMS

THE symptoms (Table III) usually consisted of post-prandial pain relieved by food or alkali. However, in 11 patients the pain was alleged to bear no rela-

TABLE III
COMMON SIGNS AND SYMPTOMS*

Loss of Weight	27
Pain—Food Relation	25
Nausea	25
Vomiting	25
Tarry Stools	18
Loss of Appetite	16
Hematemesis	12
Pain—No Food Relation	11
Fullness After Meals	6
No Symptoms	1

*For 41 patients.

tion to meals and to be aggravated by food. Nausea, vomiting, anorexia, and loss of weight were frequent accompaniments. In 24 patients, the loss of weight was marked (Table IV), ranging from 10 to 19 pounds in 11, 20 to

TABLE IV
LOSS OF WEIGHT*
(41 patients)

Pounds	Patients
0	14
1-9	3
10-19	11
20-29	8
30+	5

*For 41 patients. Sixteen patients' weight loss occurred during preceding 6 months.

29 pounds in 8, and in excess of 30 pounds in 5. Evidence of massive bleeding sufficient to produce tarry stools was noted in 18; 12 patients had hematemesis in addition to tarry stools.

LABORATORY DATA

A SECONDARY anemia was present in 22 patients. In 18 the anemia was A secondary anemia was present in 22 patients. In 18 the anemia was attributed to a recent massive hemorrhage; in 3 to chronic bleeding, occult blood being found repeatedly in the stool; and in 1 case no adequate explanation for the anemia was found.

The plasma-proteins were measured at the initial examination in 22 patients. Of this group only two had abnormally low values in spite of the fact that all gave histories of recent weight loss due to anorexia and vomiting.

GASTRIC secretion was studied in 40 patients. The ability of the stomach to secrete hydrochloric acid was demonstrated in all. The peak levels obtained after histamine varied from 8 to 112 clinical units, but were generally lower than those found in patients with duodenal ulcer of the same age group. In 5 patients the response to histamine and the night secretion was lower than that usually seen in patients with gastric ulcer.[8] In these 5 the histamine response on repeated occasions was less than 20 clinical units. In 3 the studies of nocturnal secretion revealed an absence of free hydrochloric acid on several successive nights. In spite of this low secretory rate all had recurrent chronic ulcers. As will be pointed out, two patients in this group developed persistent achlorhydria to histamine, after which their ulcers healed and remained healed.

DIAGNOSIS

THE diagnosis of a benign gastric lesion in elderly individuals may be difficult, especially in patients with atypical pain, anorexia, nausea, vomiting, and loss of weight of short duration. Such a situation was present in 9 patients. In 11, the initial roentgen findings were interpreted as those of malignant ulcer. In 2, the initial gastroscopic findings were compatible with carcinoma. In 6 patients resection of the lesion was necessary to establish the correct diagnosis. In 1 the diagnosis was made at post-mortem examination. In the remaining patients, the clinical course was compatible with that of benign gastric ulcer in that the ulcer either remained healed from three to eight years or frequent gastroscopic and roentgen examinations indicated benignity.

Roentgen examinations were made one or more times in all patients except one who died within 24 hours after admission, and usually were repeated at two to three week intervals until the ulcer healed. Gastroscopic examinations were carried out in 24 cases, usually more than one examination being necessary to follow the course of the ulcer. Approximately 100 examinations were performed in each of 2 patients over a period of 10 to 12 years.

COMPLICATIONS

Complications arising from the ulcer occurred in 28 of the 41 patients (Table V). The most common, hemorrhage, occurred in 18. All required blood transfusions. One patient, age 67, died within 24 hours after the onset

TABLE V
COMPLICATIONS*

Hemorrhage	18†
Alkalosis	7††
Obstruction	6
Perforation	0

*For 41 patients.
†1 death.
††3 patients had alkalosis associated with obstruction; vomiting in other 4.

of bleeding despite multiple transfusions; in a second patient in whom hemorrhage occurred one month following vagotomy, gastrotomy with excision of the ulcer was necessary to control the bleeding. The remaining patients recovered on medical treatment, the stools usually becoming negative for occult blood within 10 to 12 days although in several instances two to three weeks were required.

Obstruction secondary to ulceration at the pylorus, and associated with recurrent vomiting and loss of weight, was present in 6 patients. Of this group, 3 were further complicated by alkalosis. Surgery was recommended to all. Four accepted the advice and at present are free of symptoms. In 1 patient who refused surgery, the obstruction was of short duration and yielded to medical management. The other, in whom the obstruction was not complete, chose to continue on the medical regimen including nightly aspirations. He was well when last seen and was maintaining his weight.

SEVEN patients had alkalosis due to vomiting with loss of large amounts of chloride. The CO_2 content of the serum varied from 36 to 45 mM/L and the chloride from 81 to 92 mEq. The alkalosis was immediately corrected with the administration of either sodium chloride or ammonium chloride parenterally. Three of this group had stenosis of the pylorus and underwent subtotal gastric resection; in the remaining 4 the vomiting ceased after healing of the ulcer by medical management.

RESULTS OF MEDICAL TREATMENT

MEDICAL therapy was undertaken in 32 patients in whom the evidence was considered strongly in favor of a benign process; the course of the lesion was observed carefully by frequent x-ray and gastroscopic examinations.

Therapy was based on measures to neutralize or reduce the output of acid[8]. Each patient was hospitalized for periods varying from two weeks to two months. The program consisted chiefly of hourly feedings of milk, cream, and calcium carbonate, supplemented by a diet of bland foods. Constipation was relieved by the substitution of magnesium carbonate for calcium carbonate. Of the 32 patients so treated only 2 preferred other antacids; aluminum hydroxide was substituted in 1 and magnesium tricalsate in the other. Nightly aspiration of the stomach with an Ewald tube at 9:30 p.m. was carried out in all patients who were not bleeding. Atropine sulfate was prescribed frequently in order to delay gastric emptying and thereby prolong the action of the antacid. Roentgen irradiation was directed to the fundus and body of the stomach in 11 patients in an attempt to inhibit or reduce acid secretion. Total dosages ranging from 795 r to 2930 r were given in divided amounts over a period of 10 to 12 days.

Massive hemorrhage was treated by the following additional measures: absolute bedrest, sedatives for restlessness, and transfusions of whole blood as needed to maintain the blood count at normal levels. In the absence of nausea and vomiting, feedings of milk and cream and alkali were also given at two-hour intervals during the night in addition to the daytime program. In the presence of vomiting, nothing was allowed by mouth until the vomiting subsided.

The results of medical treatment are summarized in Tables VI and VII. Of the 21 patients receiving medical treatment without roentgen irradiation, the symptoms subsided immediately in 17 and the ulcer healed in from two weeks to three months. The ulcer failed to heal in 2 patients; carcinoma was suspected and both were subjected to subtotal gastric resection.

One patient died of massive hemorrhage within 24 hours after admis-

TABLE VI

IMMEDIATE RESULTS OF MEDICAL MANAGEMENT*

	Medical Management Alone	Medical Management Plus X-ray Therapy	Total
Complete Healing	17	9	26
Failure to Heal	2	2	4†
Deaths (Massive Hemorrhage)	1	0	1
Inadequate Follow-up	1	0	1
Total	21	11	32

*For 32 patients.
†Subjected to surgery.

sion. The remaining patient was symptom-free at the time of discharge, although the ulcer was still demonstrable by x-ray. She failed to return to the out-patient department.

Of the 11 patients receiving irradiation therapy in addition to medical management, relief of symptoms and healing of the ulcer took place in 9. In all, either achlorhydria or a marked reduction in acid secretion occurred. In 2 patients, the ulcer persisted in spite of rigid management. Here again, carcinoma was suspected and subtotal gastric resection performed. These two patients have remained well since operation.

TABLE VII

LATE RESULTS OF MEDICAL MANAGEMENT*

	Medical Management Alone	Medical Management Plus X-ray Therapy	Total
No Recurrences (3-8 years)	4	2	6
Recurrences (1-3 years)	6	6	12
Inadequate Follow-Up	8	1	9
Total	18	9	27

*For 27 patients.

Thus, in the entire group, immediate healing of the ulcer with relief of symptoms occurred in 26, or 81 per cent of the patients.

Of the 27 patients in whom the medical treatment was continued, the results of therapy cannot be evaluated fully in nine, because the period of observation was less than two years. However, in 8 of these the ulcers were healed and the patients were symptom-free when last seen.

Six patients, followed from three to eight years after initiation of therapy, have had no recurrences of their ulcer, and have remained in good health. Of special interest are two patients in this group. In the first, a spontaneous histamine achlorhydria developed in 1941. For the preceding seven years, the patient had experienced recurrent episodes of ulcer distress every one to two years. This patient has been free of symptoms since the development of the achlorhydria. Numerous roentgen and gastroscopic examinations have shown no evidence of recurrent gastric ulcer. The second patient received 1600 r to the fundus and body of the stomach in 1945. Prior to this time, she had frequent episodes of distress, the ulcer crater recurring at yearly intervals from 1936 to 1945. Achlorhydria to histamine developed after radiation therapy, and has persisted to the present time. The ulcer has not recurred since.

Twelve patients had recurrent gastric ulcers. The interval of recurrence

varied from one to three years. In the 6 patients who received radiation therapy, a temporary decrease in acid output occurred, the values returning to original levels within one to three months. All 6 experienced recurrences of their ulcer within a year or two after the return of acid secretion.

It should be pointed out that in 11 of the patients who had recurrent ulcers, resumption of strict medical management brought about an immediate remission. In many, the ulcer was discovered either by routine roentgen or gastroscopic examination, since the ulcer was producing no symptoms. One patient had a vagotomy for his recurrent ulcer. In spite of this, he had another recurrence within six months after operation. He resumed his medical management, and, when last seen, was symptom-free.

RECURRENCE RATE

Nineteen patients have been under observation for a sufficient length of time to determine the rate of recurrence. Six of this group, followed from three to eight years, have remained symptom-free to date. Symptoms have recurred in 13; there has been a total of 35 recurrences in this entire group. Four have had recurrences within 1 year after healing. Of 2 patients who have been under observation for two years, 1 had 3 recurrences, while the other had 1. One patient had 7 recurrences in nine years, which represented the highest recurrence rate. Of the remaining patients followed from seven to eleven years, all had 3 or 4 recurrences during this period. Of the patients who received x-ray therapy and in whom a temporary anacidity resulted, the ability of the stomach to secrete acid reappeared prior to the formation of a recurrent ulcer. Thus the natural history of gastric ulcer in the aged is similar to that of younger individuals in that the ulcer tends to recur at relatively frequent intervals if acid gastric juice is present.

RATE OF HEALING

It was possible to estimate the rate of healing of the ulcer in 19 patients frequently examined by gastroscopy and x-ray. An ulcer was considered not healed unless the symptoms completely disappeared and the crater could no longer be demonstrated by either gastroscopic or roentgen examination. The average time required for complete healing was three and a half months, the range varying from two and a half weeks to 26 months. In the latter patient a chronic recurrent ulcer was observed carefully during approximately 100 gastroscopic examinations over a period of 13 years. The ulcer finally healed and remained healed when anacidity developed after roentgen irradiation. The rate of healing of the recurrent lesions did not differ from that of earlier ulcers. This fact is illustrated in the case of a 63-year-old housewife who first developed ulcer distress in 1934, and who has now been under observation for 13 years. During this period she had 6 recurrences. In

October 1938 the ulcer reappeared, healing again in one-and-a-half months. Similarly, the following 3 recurrent ulcers took two-and-a-half months, one-and-a-half, and two months to heal. The time required for healing in the last recurrence was five months. In 1942, she spontaneously developed achlorhydria; since then she has had no distress and no roentgenologic or gastroscopic evidence of ulcer.

These observations indicate that gastric ulcer usually requires a longer period of time for complete healing in the aged than in young individuals. In this group, therefore, persistence of the ulcer crater for six or eight weeks does not per se signify the presence of a malignancy.

RESULTS OF SURGICAL TREATMENT

Fourteen patients were treated surgically. The indications for operation were suspicion of carcinoma in 6, failure to respond to medical management with consequent suspicion of carcinoma in 5, and pyloric obstruction in 4. Five patients had vagotomy, 10 had partial gastric resection, one of the latter for a gastric ulcer recurring after vagotomy. Table VIII shows the age ranges in which surgery was performed.

TABLE VIII

SURGICAL PROCEDURES EMPLOYED*

Age	Subtotal Gastric Resection†	Vagotomy††
65-69	8	4
70-74	1	1
75-79		
80-84	1	
Total	10	5

*For 14 patients.
†One patient had subtotal gastric resection following vagotomy.
††One patient had gastrotomy with excision of bleeding ulcer after vagotomy.

The results of vagotomy are shown in Table IX. One patient died four days postoperatively from a massive gastric hemorrhage. The gastric ulcer recurred in 3 patients. In the first, massive hemorrhage recurred one month postoperatively, requiring a second operation in which the bleeding ulcer was excised. This patient is now on a modified antacid program, and when last seen in February, 1949, approximately one-and-a-half years later, appeared well. In the second case the gastric ulcer recurred within six months. This patient complains also of severe intercostal neuralgia at the operative site. The third patient had a recurrent gastric ulcer one year postoperatively, necessitating a partial gastric resection; at the present time, approximately one-and-a-half years later, he has no symptoms. The fifth patient treated by

vagotomy, in the 18 months after operation, had no sole complaint other than recurrent diarrhea.

TABLE IX

RESULTS OF SURGICAL TREATMENT*

	Subtotal Gastric Resection	Vagotomy
Good Results	6	1
Recurrences	0	3†
Deaths	2	1
Inadequate Follow-up	2	0
Total	10	5

*For 14 patients.

†One patient had subtotal gastric resection one year post-operatively. One patient had resection of bleeding gastric ulcer one month post-operatively.

THE results of partial gastric resection varied (Table IX). Of the 10 patients so treated, 2 are dead. The first died five days postoperatively because of peritonitis and pneumonia. The second patient died three months postoperatively from a serum hepatitis, presumably transmitted in the blood transfusions received at the time of operation. The immediate postoperative course in the remaining patients was uneventful. Of the 8 living patients, follow-up studies were inadequate in 2. Of the remaining 6, all are reported to be well three months to seven years following surgery. Two have failed to regain their preoperative weight.

CARCINOMATOUS DEGENERATION

Carcinomatous degeneration of benign gastric ulcer, long a controversial subject, is difficult to prove or disprove. The observations obtained from the present series of patients would tend to support the view that chronic benign ulcers do not undergo neoplasia. Of the patients treated medically, 6 have been followed for more than 10 years after reaching the age of 65. All have had one or more recurrences; 1 patient had 2; 1, 3; 1, 5; 2, 6; and 1, 9 recurrent ulcers. Carcinomatous degeneration has not taken place in any of these. Although the number of cases is small, the findings assume greater significance because of the advanced age of the patients. Evidence suggesting malignant degeneration has not been obtained in a series of approximately 450 benign gastric ulcers in individuals of all ages, some under observation since 1936.

MORTALITY

SEVEN of the 41 patients are now dead. Of the 27 patients treated under medical management alone, 1 died of massive gastric hemorrhage within 24 hours after onset; 1 from carcinoma of the cervix; 1 from cardiac failure;

and 1 from causes unknown, since an autopsy was not permitted. Of the 14 patients treated surgically, 1 died of a massive gastric hemorrhage, 1 from postoperative pneumonia, and 1 from a serum hepatitis.

COMMENT

THE fact that benign peptic ulceration may manifest itself for the first time in elderly individuals is of extreme importance in relation to the problem of gastric carcinoma. In approximately 46 per cent of the patients studied, symptoms first appeared after the age of 65. In 18 patients the initial diagnosis was carcinoma, thus emphasizing the fact that the symptomatology of benign ulcer may not differ significantly from that of carcinoma. Reliance, therefore, must be placed upon the objective evidence, particularly the roentgenologic and gastroscopic examinations. The differential criteria between benign and malignant lesions need not be reviewed here. We insist, however, that if a given gastric lesion is considered to be benign, its evolution under medical management must be followed carefully by means of these two methods because relief from pain occurs in ulcerating carcinoma as well as in benign ulcer. A gastric ulcer may be finally judged as benign only if it heals and remains healed with no evidence of neoplastic infiltration at the site of the lesion. Recurrence of the ulcer, on the other hand, is not necessarily indicative of malignancy, for benign gastric ulcers commonly recur at the same site. The existence of neoplasm in such cases is indicated not by the recurrence of the ulcer but by the induration, infiltration, and nodularity of the mucosa as seen gastroscopically and roentgenologically.

Complications of ulcer occur more frequently in elderly individuals; the incidence in this series was 68 per cent. The reported incidence of hemorrhage varies from 9 to 38 per cent[4,6]. In the present series it was 44 per cent. Massive bleeding accounted for the 1 death occurring among the medically treated group. Alkalosis was present in 17 per cent, and obstruction in 15 per cent. It is of interest that acute perforation was not encountered. However, in the series reported by Rafsky[6], it occurred in 13 per cent, including both gastric and duodenal ulcer; Boles[4] reports an incidence of 9 per cent.

THERAPY should be adapted to the particular circumstances of the individual, although certain principles are applicable generally. Ideally, the patient should be hospitalized. It gives the attending physician the opportunity to familiarize the patient with the medical program suitable for him. In our experience elderly individuals tolerate the antacid regimen outlined above very well, although precautions must be taken to prevent constipation and fecal impaction. The proper use of magnesium carbonate daily (2 to 10 grams) in place of calcium carbonate usually prevents the later complications.

Alkalosis results not from the insoluble antacids, but from vomiting and loss of chloride. It is easily corrected by the judicious use of isotonic saline and 10 per cent ammonium chloride. Continued rigid medical management using antacids, as carried out in younger individuals, is, in our experience, usually the treatment of choice for hemorrhage. This regimen is preferable to starvation, which should be employed only if the patient is vomiting. Shock, anemia and dehydration are combated with the liberal use of whole blood and the subcutaneous administration of parenteral fluids. Absolute bedrest and sedatives for restlessness are necessary. This regimen, which is very well tolerated by the patient in spite of his age, is maintained until the stools are negative for occult blood. The possibility of uncontrollable bleeding from an eroded sclerotic artery is ever present; it is advisable, therefore, for the surgeon to observe the patient with the physician. Elderly people are not only poor operative risks because of associated diseases, but the precarious condition resulting from bleeding makes surgery even more hazardous. In only one case was surgery resorted to because of uncontrollable bleeding occurring after vagotomy. This patient died in spite of heroic measures.

The criteria for surgery obviously differ in elderly individuals from those in younger individuals. Absolute indications for surgery should be acute perforation, the inability to differentiate a benign from a malignant gastric ulcer after a careful trial of medical management, persistent obstruction, and uncontrollable hemorrhage. Medical management may be used justifiably, in our opinion, in recurrent gastric ulcer if all the clinical and laboratory evidence favors a benign process and if the course of the ulcer can be observed by subsequent gastroscopic and roentgenologic examinations.

Of the 14 patients treated surgically, 2 died postoperatively; 1 from massive hemorrhage after vagotomy and 1 from peritonitis; a third death three months later resulted from a serum hepatitis.

SUMMARY

THE clinical features and course of 41 patients with benign gastric ulcer past the age of 65 are reviewed. Approximately 10 per cent of the patients with this disease are in this age group. The symptoms may be of short duration and indistinguishable from those of carcinoma.

The natural history of gastric ulcer in the aged is similar to that in younger individuals; the rate of healing, however, tends to be slower. In no instance has carcinomatous degeneration been observed. The incidence of complications is greater than that usually observed in younger individuals, with hemorrhage the most frequent. Whenever the evidence in favor of a benign process is great and conditions are such that frequent gastroscopic and roentgen examinations can be made, medical management is preferred. Surgical intervention is reserved for patients

with perforation, persistent obstruction, suspicion of neoplasm or uncontrollable hemorrhage. The surgical procedure of choice is partial gastric resection.

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GERIATRICS

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Retirement Insurance—A Morale Factor

PSYCHOSOMATIC medicine has shown clearly how mental outlook and physical well-being go hand-in-hand. In no comparable field perhaps, has this relationship been so well demonstrated as in the forward-striding science of geriatrics. It is no longer questioned that declining morale can undermine bodily health, and particularly is this true among the aging.

Of the difficulties which beset the path of the aged, one major problem stands out—the menace of insecurity. If our old people were suddenly freed from harassing economic anxieties, much would be achieved towards instilling a more confident, happier outlook.

Economic insecurity was not always regarded as the inevitable companion of advancing years. But with the increasing industrialization of our economy and the shift from farm life to city life, old people have lost much of their economic value to a household. Most American families no longer live in houses where they can build on a room or a wing to shelter aging relatives. Gone are the large gardens, sewing rooms and big kitchens where the older members helped make a family's living. The aged have become "dependent" because their room, board, and other necessities cost money while they have little opportunity to earn their way. Now they need money of their own to keep the dignity and independence they had when their share in work was the equivalent of money.

How is this need for a cash income to be met? Financial independence through individual savings immediately suggests itself because thrift has always been part of the American tradition. Regrettably, with our changeover from *making* a living to *buying* a living, the opportunity to save enough for a prolonged rainy day is no longer open to many of us. A study by the Brookings Institution in 1929, one of

our richest years, showed that the majority of our families had incomes that let them save little or nothing. Similar results were obtained from a survey by the Office of Price Administration in the war year 1942. These studies further showed that well over half of all savings belonged to only one-tenth of the families.

Since individual thrift provides only a partial answer and we would not, if we could, return to the "good old days," we have looked elsewhere for a modern solution to a modern problem. One widely applied remedy was the cash allowance system. Starting in the 1920's, many States passed laws to pay regular allowances to their dependent old people. But inherent in the cash allowance system is the requirement that the aged person must be "in need." To keep the system effective and free of abuse the individual's resources are subjected to an exhaustive scrutiny. The allowance applicant usually has had to give the State a lien against his home if he owned one. It has been a depressing prospect for the aged person who had worked long and hard but found his savings slipping away and needed help. The cash allowance system met some of his financial necessities but did little to bolster morale.

The problem, then, was not merely to provide money, but to provide it in such a way as to maintain the dignity and self-respect of the individual and in accordance with the American tradition of thrift. The insurance principle seemed to offer the answer.

Insurance was long recognized as a desirable approach to the problem of economic insecurity in old age. Insurance benefits are essentially savings and come to the annuitant as an income he has paid for. He does not have to show need to qualify; he can count on a regular income through the years ahead. But the task of providing old-age security through private insurance seemed impossible of achievement for the majority of families outside the higher income groups. For many, the cost of a policy offering modest retirement income was out of reach. Some who could afford it did not "believe in" insurance or simply kept putting off the matter until too late.

The insurance idea was the guiding principle in the new program for old-age security which became law through the Social Security Act of 1935. The new, nation-wide system provided regular monthly retirement benefits for older workers who had become "insured" through continuing employment in work covered by the law. Benefits were payable out of a trust fund built up from special pay-roll taxes on workers and employers in covered occupations. The amount of each worker's monthly benefit was related to his tax contributions under the law.

In 1939, Congress broadened this program to provide monthly benefits for certain dependents of retired workers and for the families of workers who die. These changes brought greater security to retired workers, age 65 or over, to their wives or widows at age 65, and to their young children. Family security for younger workers was also provided by the payment of monthly benefits to young widows with children and for the children of insured workers who die at any age. Sometimes parents of workers who have died get monthly payments. Federal Old-Age and Survivors Insurance now pays about 55 million dollars in benefits to some 2¾ million beneficiaries every month. About two-thirds of the beneficiaries are aged 65 or more.

The program in thirteen years of operation has demonstrated the basic soundness of the insurance approach. Admittedly, there are some weaknesses. The fairly rigid scale of benefit amounts has become too small in the face of greatly increased living costs.

Persons in many occupations are still excluded from the protection afforded by the program. Proposals to strengthen and broaden the system are now being considered by Congress.

But on the credit side it has been demonstrated that such a system can be effectively and economically administered. Millions of wage earners now have the assurance of a definite income after they become too old to work. Individual thrift and the buying of private insurance have been stimulated because the basic floor of protection established by old-age and survivors insurance is a foundation on which the average man can build more complete economic security. Many aging workers are now financially able to retire instead of continuing on the job after precarious health makes such a course inadvisable. Once retired, the worker and his wife know they will find the benefit check in their mail box every month as long as they live.

Beyond that, the real significance of the monthly benefit check lies in what it represents. It is part of the proceeds of a savings account to which the worker contributed as long as he was employed. He can accept the check with pride and satisfaction. If for no other reason than this, old-age and survivors insurance stands as an important contribution to the morale of our old people.

Oscar C. Pogge*

Supplementary Protein for Aged Orthopedic Patients†

A. Della Pietra, M.D.

POSITIVE protein balance is an important postoperative factor in promoting bone healing and controlling chronic osteolytic infections in aged patients. In a series of 32 cases observed at St. Luke's Hospital, New York City, high protein intake was assured by supervision of diet and supplementary protein feedings. One group of cases included fractures of the neck of the femur, intertrochanteric fractures and nonunion fractures of the neck of the femur and another group, nonunited tibiae and femora with gross infections.

Actual eating of the diet must be observed by the nurse or dietician. Food trays must be checked for amount of food consumed. Variation in diet and emphasis to the patient of the importance of an adequate diet are necessary. The patients studied received 70 gm. of protein daily from the regular hospital diet, supplemented by six to eight tablespoons of Protinal to provide 120 gm. of protein daily.

Blood protein levels and albumin-globulin levels were estimated weekly. Blood hemoglobin levels were taken as indicated. Patients' weights were checked on admission and discharge from the hospital. Fifteen of the patients showed an increase in blood hemoglobin from an average of 84 per cent on admission to an average of 93 per cent on discharge. Average total blood protein rose from 5.7 to 6.8.

*Director, Bureau of Old Age and Survivors Insurance, Social Security Administration, Federal Security Agency.

†Value of Supplementary Protein Feeding in Aged and Chronically Infected Orthopedic Patients, N. Y. State Journal of Medicine. 49: 263-268, 1949.

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DIGESTS *from Current Literature*

On the Significance of the Normal Electrocardiogram in Old Age.

THEODORE T. FOX, M.D., *Ann. Int. Med.* 31:120-124, 1949.

Electrocardiographic examination of the aged may be useful in revealing cardiovascular changes but does not always indicate presence of heart disease. Theodore T. Fox, M.D., of the Home and Hospital of the Daughters of Israel, New York, found that the presence of heart enlargement was of more importance in determining life span of aged individuals than ECG abnormalities. Abnormal electrocardiograms occur frequently in old age but changes are not connected in the majority of cases with clinical evidence of heart disease.

Diastolic hypertension when occurring with abnormal electrocardiographic tracing was a factor frequently found associated with a shortened life span. Systolic hypertension did not indicate such a poor prognosis. Age, itself, seems of little importance in prognosis. However, duration of life is generally longer in patients with normal electrocardiograms.

Reduction of Mortality in Surgery of the Aged.

WILLIAM L. ESTES, JR., M.D., *Penn. Med. J.* 52:937-943, 1949.

Delay in operation, due largely to delay in diagnosis of an acute emergency and reluctance of the patient to consent to operation, is a major contributory cause of high mortality in emergency surgery according to Dr. William Estes, Jr.

More cases may be operated successfully if careful evaluation is made of the history, acute abdominal findings, pulse rate, and urinary and blood studies. Emergency diagnostic X-ray of the abdomen and thorax may be invaluable.

Although immediate operation may be undertaken, an hour or two of appropriate intravenous therapy and check of bladder and cardiac function may be lifesaving. Risk in elective procedures is much reduced if thorough preoperative study and preparation is carried out. Diagnostic survey should include cardiovascular estimate, nutrition and alimentary study, blood chemistry studies, urinary tract and liver function, and pulmonary survey.

All remedial defects should be corrected. The use of preoperative antibiotics is valuable. Restoration should be to the patient's normal state of maturity and not an attempt to establish a pre-senile state of normalcy.

At operation, either elective or emergency, a carefully chosen anesthetic is important as well as gentle handling of the tissue, shortest and simplest procedure possible, prevention of blood loss, and a secure closure.

The best postoperative care is planned to avoid complications by prophylaxis. Supplementary intravenous therapy should be continued postoperatively. Sedation should be adequate but not excessive. Early ambulation is desirable but contraindication such as heart lesions, shock or infection must be heeded.

Measures to avoid phlebothrombosis and thrombophlebitis serve, also, to keep pulmonary embolism at low incidence. Antibiotics are recommended for 48 to 72 hours postoperatively.

Finally, the patient must be surrounded by an optomistic atmosphere.

The merit of the regime is demonstrated by the report of a reduction of postoperative mortality in elderly patients from 10 per cent in 1943-45 to 2.5 per cent in 1946-48. During the most recent period the therapeutic plan was applied to all patients over 60 years of age.

Medical Considerations in the Care of Elderly Patients with Hip Fractures.

ROBERT J. FAHEY, M.D., RICHARD M. KILFOYLE, M.D., and JOSEPH H. SHORTELL, M.D. *New England J. Med.* 241:325-330, 1949.

Treatment of elderly patients with hip fractures requires careful evaluation of existing medical disabilities. Major surgical procedures are possible in the aged through present-day methods of penicillin, anesthesia, early ambulation, and careful preoperative and postoperative care.

Hip nailing obviates prolonged bed rest, traction, excessive nursing care, and lowers the mortality rate of hip fractures. Pre-existing medical conditions prior to hip nailing were found by Dr. Robert J. Fahey and associates, to be the most important in evaluating the course of 100 patients with fractures of the hip. Nailing was done under low spinal anesthesia and a Smith-Petersen nail inserted under either open or closed methods. Early postoperative ambulation was considered essential. Average times of ambulation and hospital stay were cut by one-half in comparison to conservative treatment.

A clear-cut history of the exact cause of the fracture gave information leading to the presence of associated disease. Cardiovascular disease was the greatest complicating factor, followed by diabetes, pneumonia, uremia, and psychoses. No type of cardiovascular disease if cardiac failure was corrected contraindicated surgery except for recent myocardial infarction.

Diabetes, disturbance of renal function as shown by elevated blood nonprotein nitrogen, and lowered CO_2 require particularly close attention.

The degree of medical disability affords a working classification: Group I—patients in good physical condition constituting good surgical risks; Group II—fair risk patients representing those with physical illnesses requiring active preoperative medical management and close postoperative care; Group III—operation contraindicated by extensive medical problems or failure of improvement with treatment.

Twenty-four to 48 hours may be required for surgical risk evaluation of a patient. Laboratory studies recommended are urinalysis, hemoglobin, rbc count, wbc count and differential. Nonprotein nitrogen, fasting blood sugar, blood CO_2 and electrocardiogram should also be obtained.

Chronic Disease and an Aging Population.

HOWARD A. RUSK, M.D., *M. Woman's J.* 56:27-30, 1949.

Rehabilitation is possible for many chronic invalids who have been hospitalized over long periods. Dr. Howard A. Rusk, M.D., of New York, N. Y., states that although overcrowded hospitals complain of chronic patients occupying most of the beds, very little is done to prepare the long-term patients to care for themselves when they leave the hospital.

Initial hospital care is often necessary, but many patients remain in the hospital because there is nowhere else for them to go. More convalescent and nursing homes are needed. Chronic